

Hoya Sections

A Complete study
Revised October 2001

*by Dale Kloppenburg
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Acknowledgments

This study started out at the suggestion of David Liddle of Mareeba, Queensland, Australia. David called and encouraged me to write up the “Section Acanthostemma” since so many of its species were found in the Philippines where I have concentrated my studies. Many species have, over time, been placed in the incorrect section. It has been stated that the sections were useless and that few people understood them. Moreover, they were not being used as study tools in understanding this complex genus. My study of one section soon expanded to the study of all sections and their origin and organization.

It was not long before after much compiling, that I found I was generating as many questions as answers. Some questions I couldn’t answer. I was soon seeking help namely from Professor Benjamin Stone. Dr. Stone is working on the “Philippine Flora Project”, a full time job. In spite of time constraints, Ben took the time to provide me with invaluable assistance. He has been most gracious in giving me advice on organization, translations, form and substance and above all, motivation. I guess I should add education. I have found his “tutoring” process to be immeasurably valuable and worthwhile. I wish here to publicly express my deep gratification and thanks for all his assistance.

It is my wish that others will find herein a useful tool and stepping stone towards a fuller and better understanding of this complex Genus Hoya.

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P.S. I have room here to express my thanks to Dr. J.F. Veldkamp of Leiden, The Netherlands who took the time to point out a lot of errors and a conflict in my sectional key. Thanks to him these have now been corrected and entered.

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Hoya Sections by Dale Kloppenburg

I. Introduction

Under the International Code of Botanical Nomenclature (ICBN) a plant can be assigned to taxa of the following ranks below Genus and of higher status than species (in descending sequence): subgenus, sectio, subsectio, series, and subseries. To date the Genus *Hoya* has been subdivided into subgenera and sectio (sections). Since only one subgenera was ever designated I will discuss this later. The sectional divisions are established in an attempt to group species with recognizably similar characteristics together. By descriptions based on a species Type in each section it is hoped in this way to delineate as precisely as possible the probable phylogeny, and to bring out the salient structures which indicate relationships. A section is a taxonomic category. Sections if natural have evolved over time just as a species or genera has. As a better understanding of the entire complex of *hoya* species has grown so to have more sections been defined; several originally as genera in their own right. Eventually many of these genera were incorporated into the genus *Hoya*. Since they represented a delineated species or group of species it was natural that they were incorporated as sectional representatives of this complex genus.

Articles #21 and #22 of the ICBN establish the rules for subdivisions of genera. See appendix #1 for these specific rules.

These sections when organized and studied can be an invaluable aid to species identification. In addition through this grouping of species into sections a better understanding of the relationships of development and evolutionary progression should evolve. This work is not complete and additional sections need to be created. The section *Hoya* needs further delineation and division into additional sections to avoid what Dr. Ken Hill (1) has termed the "amorphous remainder or paraphyletic residue". Actually a sort of dumping ground for species which we are not able to classify within other sections. This is due mostly to the short comprehensive nature of this sectional description. Dr. Hill has added some additional delineation's. As for the need of further refinement and additional sections, I am establishing four new sections. (1) One further defines and differentiates a group of species loosely associated with the Section *Sperlingia* (Vahl) Miquel (*Acanthostemma*). Some of the included species have previously been placed in the Section *Otostemma* (Blume) Miquel. (2) One other to house the monotypic species *H. heuschkeliana* Kloppenburg. (3) another to segregate out the two presently known species which have rudimentary pellucid margins on their pollinia outer edges, namely *H. darwinii* Loher and *H. mitrata* Kerr. (4) The last to cover the species allied with *H. meliflua* (Blanco) Merrill.

The first sectional divisions of the Genus *Hoya* was made by G. Don in 1837, followed by Endlich in *Genera Plantarum* (136-1840) pub.? 1841, some references say 1838 and by Decaisne, Blume, Miquel & Zollinger, J. D. Hooker, K Schumann, King & Gamble, S. H. Koorders, R. Schlechter and K. Hill. (see authors under Sectional descriptions).

II. A List of Synonyms of *Hoya* R. Brown

1810 ***Sperlingia*** Vahl, *Act. Hafn.* 6: 112. Type: *S. verticillata* Vahl =
(*Hoya verticillata* (Vahl) G. Don).

1811 ***Schollia*** Jacq. f., *Ecl. Pl. Rar.* 1:5, t.2. Type: *S. crassifolia* J.F. Jacquin. =
(*Hoya crassifolia* Jacq.).

1834 ***Physostelma*** Robert Wight, *Contributions to the Botany of India* 39. P.
wallachii Wight = **(*Hoya campanulata* Blume).**

1834 ***Pterostelma*** Robert Wight, *Contributions to the Botany of India* p.39. Type: *P.*
acuminata = **(*Hoya acuminata* Hooker f.).**

1838 ***Centrostemma*** Decaisne, *Annales Les Science Naturelles* 9 #2:271 t.10-
c. Type: *C. multiflorum* Blume = **(*Hoya multiflora* Blume).**

1838 ***Cyrtoceras*** Bennett, *Plantae Javanicae Rariorae* p.90, t.21. Type: *C. reflexum*
Bennett = **(*Hoya multiflora* Blume).**

1843 ***Cystidianthus*** Hasskarl, *Tijdschrift van. Natur. Geschieden Physiol.* 10:125,
Hoev. & de Vriese. Type: *C. campanulatus* (Blume) Hassk. =
(*Hoya campanulata* Blume).

1848 ***Otostemma*** Blume, *Rumphia* 4:30. Type: *O. lacunosum* Blume =
(*Hoya lacunosa* Blume).

1848 ***Cathetostemma*** Blume, *Rumphia* 4:30 Type: *C. laurifolium* Blume = **(*Hoya laurifolia* (Bl.) Decaisne.**

1849 ***Plocostemma*** Blume, *Museum Botanicum Lugduno-Batavum* 1:59 fig.14. Type:
Pl. lasianthum Blume = **(*Hoya lasiantha* Korth.).**
Mentioned by name in *Rumphia* 4:30 (Genus) by Blume (1848).

1849 ***Acanthostemma*** Blume, *Museum Botanicum Lugduno-Batavum* 1:57.
No Type mentioned.

III. The Type Descriptions of these Genera Follows

***Acanthostemma* Blume**

In *Rumphia* 4 (1848) 49-50. In *Museum Botanicum Lugduno-Batavum* 1 (1849) 57.

Calyx quinquepartitus. Corolla rotata, quinquefida, laciniis revolutis. Coronae staminea pentaphylla, gynostegio abbreviato adnata, foliolis sagittatis carnosa erectis, angulo

superiore in dentem antherea incumbentem producto. Antherae membrana stigmati incumbente terminatae. Pollinia basi affixa subdivergentia oblonga compressa, anguste marginata. Stigma apiculatum. Folliculi laeves. Semina plurima, ad umbilicum comosa. -- Herba pseudo-parasiticae, late in insulis Asiae tropicae et Nova Guinea dispersae, scandentes radicantes: foliis oppositis vel verticillatis carnosa, umbellis vel racemis umbelliformibus saepe multifloris; floribus parvis fuscis vel dilute purpurascensibus.

Translation:

Calyx 5 parted. Corolla rotate, pentamerous, with the lobes revolute. Corona of 5 segments, adnate to the short gynostegium, segments sagitate, fleshy, erect, with the superior (inner) angle produced into a tooth, incumbent upon the anther. With the anther terminal membranaceous, incumbent upon the Stigma. Pollinia affixed at the base erect somewhat divergent, oblong with compressed narrow sides. Stigma apiculate. Follicles (seed pods) smooth. Many seeds with a hairy-tufted umbilicus. Herb, falsely parasitic, rooting climber, widely dispersed in insular Asian tropics and New Guinea; foliage fleshy opposite or verticillate (whorled); umbels or racemes shaped like umbels often many flowered; with flowers small dark or light (dilute) purplish.

Cathetostemma Blume

In Rumphia 4 (1848) 30.

Calyx quinquepartitus. Corolla rotata, quinquepartita, laciiniis reflexis. Corona staminea pentaphyllia, gynostegio abbreviato adnata; foliolis scutiformibus, carnosus, erectis, convexis, basi bifidis, apice attenuatis et angulo interiore in dentem anthereae incumbentem producto. Antherae membrana stigmati appressa terminatae. Pollinia ellipsoidea, compressa, basi affixa, erecta. Stigma umbonatum.--Frutex Timorensis, volubilis; foliis oppositis, oblongis lanceolatis, coriaceis, subvenosis, glabris, supra petiolum glanduliferis; umbellis brevissime pedunculatis, axillaribus et interpetiolaribus, multifloris; floribus longissime pedicellatis, mediocribus, flavo-viridulis.

Translation:

Calyx pentamerous. Corolla rotate, pentamerous, the lobes reflexed. Corona of 5 segments, adnate to the short gynostegium; corona segments shield shaped, fleshy, erect, convex, with the base bifid, at the apex narrowed and with the lower side, prolonged into a tooth lying upon the anther. With the terminal membrane of the anther appressed to the stigma. Pollinia ellipsoidal, compressed attached at the base, erect. Stigma dome shaped. A shrubby climber of Timor, with leaves opposite, oblong lanceolate, leathery, slightly veined, glabrous, with glands above the petiole; umbels very shortly peduncled, from the axils and between the petioles, many flowers on very long pedicels, medium-size, yellow-green.

Centrostemma Decaisne

In Annales les Science Naturelles 9 #2 (May 1838) 271.

Calyx quinquepartitus. Corolla profunde quinquefida, reflexa, circa basin gynostegii in annulum barbatum prominens. Corona staminea pentaphylla, gynostegio elongato superne adnata; foliolis carnosis, arrectis, supra depresso, marginibus subtus revolutis, basi in cornu v. calcar patens v. recurvatum productis, apice in dentem stigma superantem attenuatis. Antherae membrana stigmati appressa terminatae. Pollinia basi affixa, erecta, oblonga, compressa, hinc pellucido-marginata. Stigma apiculatum. Folliculi solitarii, elongati, cylindracei, laeves. Semina comosa. --Frutices volubiles in Archipelago Indico, Moluccis et Philippinis crescentes; foliis oppositis, coriaceis, subvenosis, glabris; umbellis pedunculatis interpetiolaribus v. terminalibus, multifloris; floribus saepe majusculis, flavidis.

Translation:

Calyx pentamerous. Corolla deeply divided into 5 reflexed lobes, with a prominent beard about the base of the gynostegium. Corona of 5 stamens, attached at the upper part of the elongated gynostegium; corona segments fleshy, upright, depressed above, with the lower margins inrolled, at the base prolonged into a spreading or horn-like spur, at the apex narrowed into a tooth longer than the stigma. With the terminal membrane of the anther oppressed to the stigma. Pollinia affixed at the base, erect, oblong, compressed, here with a sub transparent margin. Stigma apiculate. Follicles single, elongate, cylindrical, smooth. Seed hairy-tufted. ---The climbing plant growing in the Indian Archipelago, the Moluccas and the Philippines with leaves opposite, leathery, somewhat veined, glabrous; with the many flowered umbels pedunculate between the petioles and terminal. With flowers often rather large, yellowish.

Note: this and the following genus (Cyrtoceras) are to be combined as they have the same Type species. Cyrtoceras becomes a heterotypic Synonym.

Cyrtoceras Bennett

In Pl. Jav. Rar. (4-7 July 1838) 90 t.21.

Corolla rotata, quinquefida, reflexa. Tubus stamineus longe excertus; corona pentaphylla, foliolis carnosis lanceolatis erectis, basi in cornu recurvatum productis. Antherae membrana terminatae; massae pollinis basi affixa, conniventes, compressae. Stigmatis discus depresso, papilla acutiuscula. Styli elongati. Frutex. Folia opposita membranacea. Umbellae interpetiolaris vel terminales, pedunculatae, multi-florae. Flores majusculi, annulo corollae faucis barbato.

Translation:

Corolla rotate, pentamerous, the lobes reflexed. Staminal tube long erect; corona pentamerous, its segments lanceolate, erect with the base produced into a recurved horn. With the anther terminating in a membrane, with the pollen masses attached at the base, conivent, compressed. Stigma disc depressed. Style elongated. A shrub with opposite, membranaceous leaves. With the umbels between the petioles and terminal, pedunculate, many flowered. Flowers rather large with a hairy ring in the throat..

Cystidianthus Hassk.

In Tijdschrift van Natur. Geschieden Physiol. 10 (1834) 125.

Calyx quinquepartitus. Corolla subcampanulata, repande-quinquedentata, primo patens, dein reflexa. Corona staminæ pentaphylla, gynostegio abbreviato connata; foliolis carnosis, patentibus, compressis, marginibus subtus revolutis, angulo exteriore assurgente, interiore in dentem antheræa incumbentem productis. Anthereæ membrana stigmati appressa terminatae. Pollinia basi affixa, erecta, oblonga, compressa, hinc pellucido-marginata. Stigma convexum, pentagonum, muticum. Folliculi abortu solitarii, elongati, cylindracei, laeves. Semina comosa. --Frutices Archipelagi Indici, facie Centrostemmati.

Translation:

Calyx pentamerous. Corolla somewhat campanulate, shallowly 5 lobed, at first the lobes spreading, later reflexed. Corona of 5 segments, fused to the short gynostegium; corona segments fleshy, spreading, flattened with the lower margins inrolled, the exterior angle rising upward, interior produced into a tooth lying upon the anther. With the terminal membrane of the anther appressed to the stigma. Pollinia attached at the base, erect, oblong, flattened, here with an almost transparent margin. Stigma convex 5-sided blunt. With the seed pod solitary through abortion, elongate, cylindrical, smooth. Seeds harrt-tufted. Shrubs of the Indian Archipelago with the general appearance of a Centrostemma.

Note: this genus becomes a heterotypic synonym of the genus *Physostelma* Wight since they both have the same type species.

Otostemma Blume

In Rumphia 4 (1848) 30.

Calyx quinquepartitus. Corolla rotata, quinquefida, laciniis revolutis. Corona staminea pentaphylla, gynostegio elevato adnata; foliolis navicularibus, carnosis, divaricatis, supra

concavis, angulo interiore in dentem antheram superantem producto, subtis appendice deorsum bidentata auctis. Antherae stigmati incumbentes, apice simplices, acutae. Pollinia basi affixa, erecta, approximata, linearia, compressa. Stigma obsolete apiculatum. Folliculi laeves. Semina plurima, ad umbelicum comosa. - Herba Archipelagi Indici, in arboribus radicans; foliis oppositis v. radius verticillatis, carnosis, glabris; umbellis longiuscule pedunculatis; floribus parvis, albidis.

Obs. Ad Hoya recedit dentibus coronae stamineae supra antheras productis, eujus foliola subitus esuicata singula appendice bidentata sunt praedita, nee non antheris simpleibus haud membrana terminatis. Alias quoque stirpes sub Hoya militantes ad hoc Genus referendas esse probabile videtur; qua de re diligens florum exploratio docebit. Nomen derivatum ad oto, aures, et stemma, corona.

Translation:

Calyx pentamerous. Corolla rotate pentamerous, the lobes revolute. Corona of 5 segments, adnate to the elevated gynostegium; corona segments boat shaped, fleshy, spreading widely, above concave, with the interior angle prolonged into a tooth overtopping the anthers, and beneath with 2-toothed enlarged, appendix bent downward. With the anthers incumbent on the Stigma, with the apex simple, acute. Pollinia attached at the bases, close together, linearly compressed. Stigma scarcely apiculate. Follicles smooth. Seeds many, with a hairy-tufted umbiliculum. Herbs of the Indian Archipelago, rooting in trees; leaves opposite or rarely whorled, fleshy, glabrous, umbels with moderately long peduncles; with small white flowers.

Observation. Differing from Hoya in the corona segments being produced above the anthers, and each segment with a groove beneath but furnished with a single 2-toothed appendix, and also the simple anthers not terminating in a membrane. Each Hoya of the Genus till now was grooved below, it seems probable this represents a mutant; but the floral structure must be diligently observed. The name is derived from oto, ear, and stemma, crown.

Physostelma Wight

Note: Section Cystidianthus (Hasskarl) King & Gamble is a Synonym based on the same Type species. In addition King & Gamble in Materials for the Flora of the Malaya Peninsula, it was used as a Section but without description.

In Contributions to the Botany of India (1843) 39.

Calyx 5 partitus. Corolla rotata, patens, repande 5-dentata Corona staminae 5-phylla, foliolis inflatis, antheris oppositis. Antherae membrana terminatae. Filamenta e basi ad apicem bipartita, cruribus cum crure segmenti utrinque proximi arcte coalitis, filamenta 5

antheris coronaeque folis alternantia corpusculis stigmatis opposita efformantibus. Massae pollinis basi afixae, erectae, subcylindraceae. Stigma depresso.--Frutex volubiles indici v. javanici. Folia opposita carnosa; umbellae laterales longiuscule pedunculatae, flores magni.

Translation:

Calyx pentamerous. Corolla rotate, spreading, the 5 lobes spreading wavy. Corona of 5 segments, these are inflated, with opposite anthers. Anthers terminated by a membrane. Filaments 2-parted from the base to the apex, the shanks with each segment on both sides closely approaching its neighbor, filaments 5 with the anthers and corona segments alternating, together forming a body opposite the stigma.. With the pollen masses basely attached, erect, almost cylindrical. Stigma depressed. --Indian and Java climbing shrubs. Leaves opposite, fleshy; umbels lateral on long peduncles, few flowered, flowers large..

Plocostemma Blume

In Museum Botanicum Lugduno-Batavum 1 (1849) 57. Name mentioned in Rumphia 4 (1848) 30.

Calyx quinquipartitus. Corolla quinquefida patens v. reflexa, intus ad basin stuposa. Corona staminea pentaphylla, gynostegio subsessili adnata, foliolis carnosus, erectis, compressis, subitus conduplicatis, angulo interiore in dentem antherae incundentem producto. Antherae membrana stigmati incundente terminatae. Pollinia basi affixa erecta, oblonga, compressa, hinc marginata. Stigma apiculatum. Folliculi...—Frutices Archipelagi Indici, volubiles; foliis oppositis coriaceis subvenosis glabris; umbellis pedunculatis terminalibus v. interpetiolaribus multifloris.

Translation:

Calyx pentamerous. Corolla pentamerous the lobes spreading or reflexed, near the base inside with a tuft of matted hairs. Corona pentamerous, adnate to the somewhat sessile gynostegium, the compressed segments fleshy, erect, pleated beneath, with the interior angle prolonged into a tooth lying upon the anther. With the anther terminating in a membrane lying upon the stigma. Pollinia erect, oblong, compressed, attached at the base here marginate. Stigma apiculate. Follicles not known. Twining shrub of the Indian Archipelago; leaves opposite, leathery somewhat veined, glabrous; with the umbels pedunculate terminal or between the petioles, many flowered.

Pterostelma Wight

In Contributions to the Botany of India (1834) 39.

Corolla rotata, 5-fida. Corona staminea 5-phylla; foliolis membranaceis lateribus reflexis, angulo interiore in dentem subulatum erectum producto. Antherae membrana terminatae. Massae pollinis erectae, approximatae, ad dorsum corpusculi basi afixae. Stigma apiculatum. -- Frutex volubilis ? aut decumbens ? Folia opposita, oblonga, acuminata, carnosa. Flores majusculi. Corolla alte 5-fida, segmentis linear-lanceolatis, tubo piloso. Coronae foliola lata, lateribus arcte reflexis marginibusque conniventibus, ita ut Papilionis sedentis alae.

(In English when this was considered a separate genus) This genus is allied to *Hoya* both in habit and in the structure of the flowers, differing principally in having foliaceous in place of fleshy crown-leaves, and in the dorsal not lateral attachment of the pollen masses to the corpuscle.

Translation:

Corolla pentamerous, rotate. Corona 5-segmented, the segments membranaceous, with the sides reflexed, the interior angle produced into subulate tooth. With the anther terminating in a membrane. Pollen masses erect, close together, basely attached to the back of the corpuscle (retinaculum). Stigma apiculate. --Twining shrub or prostrate ? Leaves opposite, oblong, acuminate, fleshy. Flowers somewhat large. Corolla not deeply 5 lobed, with the lobes linear-lanceolate, the tube shaggy within. Corona segments broad, the sides strongly reflexed and the margins connivent, in the manner of the wings of a sitting butterfly's.

Schollia Jacq. f.

In Ecl. Pl. Rar. 1:5 t.2. (1811). (*unable to acquire a copy of the original text*).

Sperlingia Vahl

In Act. Hafn. 6:112. (1810).

Sperlingia

Botaniken synes Konig Christian den 4de meget at have yndet. Han stiftede ikke allene ben forste offentlige botaniske have her I Landet, men anlangde og en dor fig selv bed Rosenborgs Slot. Til Opseer over benne satte han Otto Sperling. Vel harbenne ikke efterladt fig andet Beviis paa sin kundskab am Værter, end bolt en Fortegnelse over Haven ban forestod, Hortus Christianaeus Hafn., men hans Samtidge, der vare I Stand til at bedomme ham I benne henseende, ansaae ham for at være vel bedandrit deri. Maskee, ifald han ikke var bleven idbviklet med Corfitz Ulfeld, han havde aflagt flere prover paa sin kundskab. Mange gives, som ikke have bidragt mere, og adskillige mindre til Bidenskabens, Underdelse, end Sperling, after hvilke man har opkaldet planter. Teg troer, att bet saaledes kan indskyldes, at jeg har villet bevare bennes Minde fom Botanist

Slægten, som jeg har benævnt efter ham, beter ligesom forrige til Contortæ, udmærker far de bvrige Slægter ved at de aflange kronblade ere baade, hvorved de faae et Udseende, som om de vare dobbelt trekantede, den ene Vinkel indad vendt, de to udad, og hver af disse endende fig I en lidt længere fremstaaenden Spidse. Saavel Figuren af *Nummularia lactea major* Rumph. amb. 5. t. 175., som Blomstermaaden og Beskrivelen af koronen, passer saa fuldkommen til de 2de Værter, som jeg her leveter beskrevne, at jeg ikke tvivler om, at de hore til benne Slægt. Teg anseer endog den han kalder *Nummularia lactea major* tab. 175. f. 1. at være samme med den jeg kalder *Sperlingia opposita*.

Character Essentialis.

Contorta. Nectarium stellula simplex genetilia tegrens. Petala 5, apice marginibusque inflexis triangularia, plana, conduplicata.

Translation: (by Dr. Bertel Hansen of the Botanical Museum at the University of Copenhagen, Denmark).

.....King Christian the 4th apparently loved botany. Not *only* did he establish an official Botanical Garden in the county, but he also arranged a private garden at the Rosenborg Castle. To supervise his private garden he employed Otto Sperling. This man did not leave other proof of his knowledge about plants *except* a mere list (of plants) of the garden, he supervised, *in* Hortus Christianaeus Hafn.(iensis), but his contemporaries, capable of evaluating him in this connection, considered him to be well founded in this (i.e. knowledge of plants). May be, if he had not been connected with Corfitz Ulfeld (sentenced for high treason), he would have given more examples of his knowledge. Plants have been named after many, who did not contribute more, and several less, to the spread of science, than Sperling. I think. it may therefore be excused that I have wanted to preserve the memory (of Sperling as a botanist).

The genus, I have named after him, belong as the former to Contortae, distinguished from the other genera by the elongate petals being in the apex and laterally inflexed hereby appearing double triangular, one angle pointing inwards, two outwards, and each of these terminating in a slightly protruding tip (very hard to imagine; the Latin text is easier). The illustration of *Nummularia lactea major* Rumph. amb. 5. t. 175., and the description of the corolla are in close agreement with the 2 plants, I describe here, and do not doubt that they belong to this genus. I even consider the one he calls *Nummularia lactea major* tab. 175. f. 1. to be the same as I call *Sperlingia opposita*. (bracketed remarks are Dr. Hansen's) *italics are mine*.

Essential Character.

Contort. The simple star shaped nectary covering the genetilia. Petals 5, flat with the triangular apices and margins inflexed, rolled longitudinally (lengthwise).

IV. Sections of *Hoya* R. Br. Originally Published as Such

(1) Invalid names (not usable under the current nomenclature rules):

1837 ***Hoyae Verae*** G. Don, General System of Gardening and Botany 4:125, no type mentioned.

1856 ***Eu-Hoya*** Miquel, Flora van Nederland Indië 1:516, no type mentioned.

1885 ***Euhoya*** Hooker, J. D., Flora of British India 4:53.

(2) Valid names:

1837 ***Hoya*** in General System of Gardening and Botany, G. Don 4:125. Type:
Hoya carnosa R. Brown. The section was automatically created (as an "autonym") with the division of the Genus into sections. (see appendix under Article 6.8 and 22.2).

1883 ***Ancistrostemma*** J. D. Hooker, in Flora of British India 4:53. Type: ***Hoya edeni*** King ex Hooker.

1911 ***Kloiphora*** King, in Journal of the Royal Asiatic Society, Bengal Branch "Flora of the Malayan Peninsula" 2:559. Type: ***Hoya curtisii*** King & Gamble.

1913 ***Oreostemma*** Schlechter, in Botanische Jahrbücher 50:105. Type: ***Hoya oreostemma*** Schlechter p.126.

1913 ***Eriostemma*** Schlechter, in Botanische Jahrbücher 50:106. Type: ***Hoya coronaria*** Blume p.135.

1916 ***Peltostemma*** Schlechter, in Beihefte zum Botanischen Centralblatt 43 #2 p.15, "Neue Asclepiadaceen von Sumatra & Celebes" Type: ***Hoya maxima*** (Karst.) Warburg.

1993 ***Skenostemma*** Kloppenburg (here published) Type: ***Hoya heuschkeliana*** Kloppenburg.

1993 ***Rudimentalia*** Kloppenburg (here published) Type: ***Hoya darwinii*** Loher.

1993 ***Amblyostemma*** Kloppenburg (here published) Type: ***Hoya meliflua*** (Blanco) Merrill.

V. Names of Genera Placed at the Rank of Section

1848 ***Physostelma*** (Wight) Blume, in Rumphia 4:32. Type: ***Hoya campanulata*** Wight. Synonym *Cystidianthus* (Hasskarl) King (genus placed at the rank of section 1901).

1856 ***Otostemma*** (Blume) Miquel, in Flora van Nederlandsch Indië 1:525, Type: ***Hoya lacunosa*** Blume.

1856 ***Sperlingia*** (Vahl) Miquel, in Flora van Nederlandsch Indië 1:523
Synonym: *Acanthostemma* Blume. Type: ***Hoya verticillata*** (Vahl) G. Don.

1856 **Cathetostemma** (Blume) Miquel, in l.c. (as the proceeding one) p.525. Type: **Hoya laurifolia** (Bl.) Decaisne.

1856 **Plocostemma** (Blume) Miquel, in l.c. p.526. Type: **Hoya lasiantha** Korthals.

1883 **Crytoceras** (Bennett) Hooker f., in Flora of British India p.52. Type: **Hoya multiflora** Blume. A misspelling of Cyrtoceras Bennett.

1883 **Pterostelma** (Wight) Hooker f., l.c. p.53, Type: **Hoya acuminata** Wight.

These sections when organized and studied can be an invaluable aid in species identification. Understanding the characteristics governing how and why hoya species fit into each section is a valuable aid in placing a name to a unknown hoya plant. To disregard these sectional characteristics entirely is to fall into the trap of false identifications. As with most classification structures, becoming familiar with them greatly aids in our understanding of species relationships. A note of caution: it does not follow that every species placed in a section by an author actually belongs there. All of us are prone to make misjudgments, misunderstandings and incorrect conclusions (there are quite a number in the literature). Furthermore it may be possible to refine the sections and/or add new ones by closer study. By constant correction and refinement, progress will be made toward better, clearer classification. This will lead to greater understanding of the complexities and beauty within the Genus *Hoya*.

Note: Miquel placed *Sperlingia* and *Acanthostemma* Genus (as a synonym) together in a section. In Dec. 1993 after studying the description of *H. verticillata* (Vahl) Miquel it became evident to me that this species was in the Section *Hoya*. Dr. J.F. Veldkamp of the Rijksherbarium in The Netherlands obtained the original publication of the Genus *Sperlingia* along with Vahl's species descriptions. This confirmed that this genus was based not on bilobed coronal hoya species, but on species in the Section *Hoya*. Subsequently the two species *Sperlingia verticillata* Vahl and *S. opposita* Vahl ((*H. verticillata* (Vahl) Don and *H. opposita* (Vahl) Don)) were determined by Ruurd van Donkelaar (also in The Netherlands) to be *Hoya parasitica* Wall. ex Traill*. The implication then is that all the bilobed species of hoya included by Miquel under the Section are incorrectly placed there. Thus the formation of a new hoya section to house these bilobed species. This new section was created in April 1994 by me and is named *Hoya Section Acanthostemma* (Blume) Kloppenburg. Its type species is *Hoya rumphii* Blume ex Hooker f..

* 12/2001 (DK) I now believe this determination to be incorrect and both species are not identical and neither are *H. parasitica*.

VI. A Key to the *Hoya* Sections

by Dale Kloppenburg

1a. Leaves not paired, circular (shield -shaped) imbricate, one aborts
.....Section **Peltostemma** Schltr..

1b. Leaves paired, opposite,

2a. Corona scale outer lobe below, not sulcate; pentamerous skirt (annulus) and 2 teeth like projections pointing away from the median line
...Section **Otostemma** (Blume) Miquel.

2b. Corona scales sulcate below, no pentamerous skirt,

3a. Flowers small under 1.6 cm. in diameter flattened, natural form much smaller,
4a. Corona scales almost columnarSection **Oreostemma** Schltr.

4b. Corona scales otherwise.

5a. Corona scales outer lobe raised above inner lobe, corolla reflexed, subtended by an inflexed annulus.....Section **Kloiphora** King.

5b. Corona inner lobe higher than outer lobe, corolla not reflexed, no annulus present,
6a. Corolla urceolate.....Section **Skenostemma** Klopp..
6b. Corolla revolute.....Section **Acanthostemma** (Bl.) Klopp..

3b. Flowers larger than 1.6 cm. flattened,

7a. Pollinia with rudimentary or no pellucid edge,
8a. Pollinia with no pellucid edge,
9a. Translators long and twisted, affixed centrally or above to the retinaculum; column long woolly matted.....Section **Eriostemma** Schltr..
9b. Translators not twisted, narrow, basely affixed to retinaculum, gynostegium sessile.....Section **Cathetostemma** (Blume) Miquel.

8b. Short rudimentary edge, pollinia stubby.....Section **Rudimentalia** Klopp..

7b. Pollinia with well developed pellucid sterile edge.

10a. Corona scales very upright, long inner lobes.
11a. Prominent beard at base of gynostegium, column long, inner corona apex attenuate, flower mid-size.....Section **Centrostemma** (Decaisne) Hooker.
11b. Column sessile, bald, inner corona apex 2-fid incurved, hooked,
.....Section **Ancistrostemma** Hooker f..

10b. Corona scales otherwise, short inner lobes,

12a. Corona scales outer lobe erect,
13a. Calyx small, lobes 2 mm. long,
14a. Corolla densely woolly at base, reflexed, coronal outer lobe erect.....Section **Plocostelma** (Blume) Miquel.
14b. Corolla not woolly at base, campanulate, coronal outer lobe raised
.....Section **Physostelma** (Wight) Blume.

13b. Calyx large, lobes +/- 8 mm. longSection **Pterostelma** (Wight) Blume

12b. Corona scales horizontal,
15a. Corolla revolute, coronal outer lobe obtuse,
.....Section **Amblyostemma** Kloppenburg
15.b Corolla rotate, corona outer lobe tapering (acute)Section **Hoya**

VII. Sections Accepted

I here present the sections in the order in which they appear in the key with an English translation and possible discussion. They are as follows:

Section *Peltostemma* Schlechter

In Beihefte zum Botanischen Centralblatt 34 (1916) 5.

Hoya maxima (Karst.) Warburg together with *Hoya imbricata* Decaisne from the Philippines constitute the section, which I here name *Peltostemma*, because of the shield-forming leaves, as well as in the habit (of growth), but also the structure of the blooms which are remarkably characteristic. The apparently dovetailed (imbricate) regular, almost circular, close-fitting leaves, which are fastened to the substrate, are pretty little things and stand upon a pedestal, complete growing leaf pairs, that in their arrangement are closely fitted in such manner, botanically speaking that resemble the *Conchophyllum* and for sure the *Dischidia* species of the Section *Collyris*. In the blooms the Section *Peltostemma* is distinguished through the inclined corona scales and the long extended anther appendages. In addition the stigma head is hollow on the point and slow to open in comparison to the rest of the sections. Type species (designated here) ***Hoya maxima*** (Karst) Warburg.

Section *Otostemma* (Blume) Miquel

Section 4. *Otostemma* Miquel Flora van Nederlandsch Indië 1:525.

Flowers small white; corolla revolute; corona scales boat shaped, below are two tooth-like processes. Anther apex acute. I add that the most prominent character of this section is the pentamerous skirt which hangs from the base of the outer corona scale lobes and lack of sulcation below. Type species for the section is ***Hoya lacunosa*** Blume.

Section *Kloiphora* King

In Journal of the Royal Asiatic Society, Bengal Branch 2:53.

Corona-processes with lower lobe globose, hollow; upper shorter- curved; corolla-tube with a broad annular ring (corolline corona ?). Type for the section is ***Hoya curtisii*** King & Gamble.

Section **Skenostemma** Kloppenburg

Sect. nova. Pedunculus pedicellisque brevis, floribus parvibus, corolla urceolata laciniis recurvis, coronae stamineae phylla lateris bifida. Skeno = covered and stemma = crown. The covered crown hoyas.

Found in the Philippines with at least two color forms. Type species: **Hoya heuschkeliana** Kloppenburg, Pancho #2175, CAHP. (see under Sectional descriptions for further delineation's).

Section **Acanthostemma (Bl.)** Kloppenburg

In Hoya Section Acanthostemma (Blume) Kloppenburg (1994) 2. The species *Hoya rumphii* Bl. ex Hooker f..

Description same as for the Genus Acanthostemma Blume in *Rumphia* 4 (1848) 49-50.

Section **Eriostemma** Schlechter

In *Botanische Jahrbücher* 50 (1913) 106 & 135.

Translated from the German 106:

Section VII. **Eriostemma** the stems and leaves with all surfaces (parts) covered with short soft hairs; in other respects its blooms possess marked sharp characteristics..... The gynostegium stands upon a column which goes down into the crown of the collar of the corolla which is covered with shaggy cottony hairs. The corona scales are comparatively short. The blooms are large or very large with a well developed thickly hirsute calyx. Type species of the Section is **H. coronaria** Blume.

Translated from 135:

Section VII. *Eriostemma* Schlechter. I thought it best to present here this distinctive section *Eriostemma*. This section is so well and sharply different, that one could consider whether or not to regard it as a separate sub-genus. I have so far presented above briefly the main points, but now I wish to present them once again in more detail. In habit there is a strong similarity that can be found with *EU-Hoya*, but the branches are softer and more fleshy and consistently with more or less soft hairs. The peduncles are extraordinarily thick and soft textured, the calyx as with *Pterostemma* more strongly structured, and the large hairy blooms are likewise fleshy. The gynostegium with the corona scales stand upon a woolly matted column that is the outgrowth formed of the filaments, which are united with the corona tube. The pollinia are distinguished (marked)

as opposed to the other *Hoya* species by means of the fact that the translators have undergone a strong development and exhibit a twist; also the retinaculum is rather large. The pollinia are more club shaped and moreover do not have the keel on the outer edge, characteristic of other *Hoya* sections.

The number of species belonging to this section is still small, but certainly with the wider search into the Malay-Papua Flora Sphere, many yet belonging here will be added.

For example the most western species *H. coronaria* Blume, is to be considered which comes from the Malayan Peninsula and Sunda Islands, as is known. *H. ariadna* Decaisne is described from the Island of Amboina. Two more unpublished species I know of come from the Philippines and the Celebes, the others are from Papua. Of the latter are *H. purpurea* Blume and *H. neo-guineensis* Engler from Dutch New Guinea and *H. guppyi* Hemsl. as well as *H. affinis* Hemsl. come from the English Solomon Islands. In the German parts of Papua, I know of at present the four species mentioned here, namely *H. purpurea* Blume, *H. hollrungii* Warburg, *H. gigas* Schlechter and *H. lauterbachii* K. Schumann. The first of these four species I know from locations in close proximity to the sea coast, but they also go further inland into the forests of the hills, to about 300 meters altitude. The other three species remaining of the section are inhabitants of the hill forests, and are likewise terrestrial growers, but with their vines often enveloping whole bushes and small trees. In particular they are found along stream and forest edges.

Section Cathetostemma (Blume) Miquel

Section V. Cathetostemma in Miquel, Flora van Nederlandsch Indië, 1 (1856) 525.

Translation:

Flowers midsize, yellowish green, corolla lobes reflexed, corona scales sickle-shaped, convex, 2 parted at the base, stigma dome-shaped. Type for the section is ***Hoya laurifolia* (Bl.) Decaisne**.

Section Centrostemma (Blume) Hooker

Section 1: in Flora of British India 4 (1883) 52.

Note: This section was named by J. D. Hooker Section *Cryptoceras*, evidently a misspelling of Bennett's *Cyrtoceras*. This is based on a genera which is a heterotypic synonym of the Genus *Centrostemma*. In addition to these two errors the status of this species (or group of species) as being in the Genus *Hoya* is in question.

Corolla reflexed, lobes longer than broad, column stipitate; coronal-processes very long, erect, with a long spur diverging from the base of each. Type for the section is **Hoya multiflora** Blume.

Section Rudimentalia Kloppenburg

Sect. nova. Umbellae multiflorae, flores glabrae magnae glaberrimae nitidae, corolla profunde lobata tubo perbrevi; lobi cordato-ovati, reflexi. Coronae foliola erecte, triquetro-conicae, magnae, subitus usque ad basin sulcatae, pollinia subcompressa in glandulo rhomboideo fere sessilie, sterilis margine brevis vel rudimentalis. Pollinia with rudimentary pellucid steril margine (between full edged and none).

Type species for the section is **H. darwinii** Loher.

Section Ancistrostemma Hooker

In Flora of British India 4 (1883) 53. In English:

Corolla reflexed, lobes longer than broad. Column sessile; coronal-processes gibbous and 2-lamellate below, produced upwards into long erect points, each with a 2-fid incurved hooked tip. Type species is **Hoya edeni** King ex Hooker.

Section Pterostelma (Wight) Hooker

Hooker, J. D. in Flora of British India 4 (1883) 53.

Corolla reflexed, lobes longer than broad. Column sessile, obconic; coronal-processes laterally compressed, semi-cordate, 2-winged, with an erect subulate point in the inner angle. Plocostemma Blume.

Type species is **Hoya acuminata** Hooker f.

Note: Hooker has placed this with Blume's Genus Plocostemma. The sections, however, are based on different type species. In addition the two descriptions are different. As pointed out by Dr. R. Schlechter they differ in their calyx. I feel this alliance is incorrect.

Translated from Schlechter in Botanische Jahrbücher 50 (1913) 124-125.

Section IV **Pterostelma** (Wight) Hooker, distinguished through the corona scales that are deeply (strongly) bent upwards, and whose outer parts stand rather erect (straight up), opposed to this the forward extremity stretches up to the anther apex. The blooms are like the previous section, (Plocostemma) rather conspicuous with open corolla, only the calyx is different, the segments in this section are larger throughout. Type of the section is for the Western species, *H. acuminata* Hooker f. (*Pterostelma acuminata* Wight), for the

Eastern species *H. albiflorum* Zipp. (*Pterostelma albiflorum* Blume). Type is **Hoya acuminata** Wight.

Hill in *Telopea* 3 (2) 1988 adds the following data. Peduncles ageotropic. Pedicels equal. Corolla campanulate. Coronal scales ovate concave above, inner angle apiculate, outer angle rounded. Caudicles unwinged. Mesophyll differentiated. Epidermal spotting absent.

Section **Physostelma (R. Wight) Blume**

Blume in *Rumphia* 4 (1848) 32 (as *Physostemma*).

The leaflets of the staminal corona somewhat inflated, with revolute margins, below with a gaping longitudinal fissure.

From Schlechter's German in *Botanische Jahrbücher* 50(1913) 105.

Section VI. **Physostelma** (Wight) Bl. contains the species with the broad bell shaped corolla, and a corona which reminds one of *Eu-Hoya*, which is rarely somewhat compressed laterally. Perhaps subsequently two sections will be needed here, in which case a section named for the species with the laterally compressed corona lobes, as seen from above, will be needed. Viewed from above the corona looks small, the calyx is always small. The blooms are rather large, at times very large. Type species of the section is **H. campanulata** Blume.

Hill in *Telopea* 3 (2) (1988) 244/246 adds: Peduncles ageotropic. Pedicels equal. Corolla campanulate. Coronal scales oblong-linear, rounded above, inner angle acute, produced forward, outer angle rounded, produced forward. Caudicles unwinged. Mesophyll strongly differentiated. Epidermal spotting absent.

Section **Oreostemma Schlechter**

In *Botanische Jahrbücher* 50 (1913) 106.

Translated from the German:

Section V. **Oreostemma** is at the present the only one known to me by the species here described, which is hereby distinguished through the almost cylindrical fleshy corona scales with the outer parts almost completely bent perpendicularly (vertically) upwards, so that the forward as well as the other end falls off abruptly to the anther (extremity) apex. The blooms are midsize (medium large) with small calyx, the corolla, bent back strongly. Type species of the section is **H. oreostemma** Schlechter.

Section **Plocostemma** (Blume) Miquel

In Miquel Flora van Nederlandsch Indië 1 (1857) 526.

Section 6. Corolla somewhat large, with hairy-tomentum near the throat and at the base of the flap hairy-tomentose, corona scales erect, pleated below; stigma apiculate. Leaves often slender, fleshy, and membranaceous when dry.

Type species is **Hoya lasiantha** (Bl.) Korthals.

Translated from Schlechter's German in Botanische Jahrbücher 50 (1913) 105.

Section III. **Plocostemma** (Blume) Miq. containing only a few species with strongly open corollas and large upright, laterally compressed corona scales, with the forward extremity stretched upward to the anther extremity. The blooms are rather large and pretty to look at, the calyx is small. Type of the section is **H. lasiantha** (Blume) Koth. (*Plocostelma lasianthum* Blume).

Section **Amblyostemma** Kloppenburg

Sect. nova. Folia crasso-carnosa utriusque glabra, marginibus reflexa, pedunculi breves petiolo breviores, corolla cum lobis revolutis, extus glabra, intus papillisa. Coronae lobi crasso-carnosi dorso canaliculati, supra concavo-excavati cum tuberoello parvo in cavitate; subitus sulcatis, stigmata apiculata, flores magma. Type species: **Hoya meliflua** (Blanco) Merrill.

Section **Hoya**

In G. Don, General System of Gardening and Botany 4 (1837) 125.

Twining, scandent, or decumbent shrubs, usually radicant. Leaves fleshy. Leaflets of the corona furrowed beneath. Type species is **Hoya carnosa** R. Br.

VIII. Salient Features of the Hoya Sections

There have been some additions by various taxonomists to the original sectional descriptions. Now as they appear in the "accepted list" I will proceed to discuss these sections and point out the salient characters:

Peltostemma Schlechter. *Pelt* = a shield and *stemma* = crown. A shield crowned *hoya*. This section was established to cover a small group of *hoyas* in which one leaf of a pair aborts or otherwise fails to develop. The leaves are circular convex on top with the

concave surface covering the stem and appressed to the substrate (usually tree trunks). Many rootlets develop from under these leaves attaching to the substrate, and often the spaces are occupied by small ants. The corona scales are very upright with long emerging anther appendages extending from the flower center, rising above the scale's inner lobe. The anther wings are prominent. The pollinia are rather long and narrow, and the translators broad and scapulate with the caudicles long and narrow as is also the retinaculum. The delineating features are thus:

1. One circular shield-like leaf per node
2. Leaves appressed to the substrate
3. Leaves tend to be imbricate
4. Coronal scales upright
5. Anther appendage very long and narrow, extended
6. Anther wings prominent
7. Styler head hollow at apex
8. Translators broad, scapulate
9. Pollinia, caudicles and retinacula long and narrow

Otostemma (Blume) Miquel, *oto* = ear and *stemma* = crown (The Ear Crowned Hoya). There is little dispute regarding this section since its characteristics are well delineated and up till now very few species have been discovered with the sectional characteristics. The flowers are small with revolute very pubescent corollas. **Hoya lacunosa** Blume is the type species. From the lower surface of the coronal scale project two dentate structures, but even more striking is the pentagonal skirt or annulus extending below with each corner being below the anther wing area. It is continuous (in *H. lacunosa*) except for a visible short slit at the intersecting corners. In the Borneo species the corners are rounded slightly and slightly spread like bifid tongues. Another species from Borneo sold in commerce, as *H. sp. F-484*, is somewhat intermediate but with a very distinctive pollinarium. There has been speculation recently about the 2 acute dentate structures on the ventral side of the thin coronal scales outer coronal lobe. These structures are clearly visible in my photomicrograph of *Hoya lacunosa* Blume they were drawn as two adjacent triangles in Blume's figure. The thickening of the central portion of the lower surface of the outer lobe spreads outward to form the tooth. There are species that evidently belong in this section from Borneo that do not possess these teeth. I feel this character should be removed from the sectional traits so as to include these Bornean species. It is the column that extends the gynostegium and not the skirt that surrounds it. These teeth should not be confused with the bilobed extensions in the Section Acanthostemma (Bl.) Kloppenburg.

1. Gynostegium elevated
2. Flowers small
3. Corolla rotate, revolute
4. Corona scales boat shaped, fleshy thin translucent on outer edges
5. Corona scales diverticulate
6. Corona scales concave above
7. Corona scales interior angle toothed, superior or equal to the

anthers

8. Corona scales below with bidentate appendage and annulus, not sulcate
9. Stigma (styler head) rudimentary, apiculate *
10. Leaves glabrous
11. Umbels with moderately long peduncles

* Stigma (styler head) on *H. obscura* Elmer ex Burton has a columnar base (slightly tapering upward) with a triangular mealy head.

Kloiphora King . *Cloe* = a collar and *phoro* = to bear. A collar bearing hoyas. Again this is a monotypic Section consisting at present of only *H. curtisii* King & Gamble, from Malaya, designated as Section at its conception. Sectional characters:

1. Corolla tube with a broad annular ring
2. Corona scales lower lobe globose
3. Corona scales lower lobe hollow
4. Corona scales upper lobe short curved

Specific characters could be added from the species, however doing so may narrow the diagnosis too greatly.

Skenostemma Kloppenburg. *Skene* = covered place and *stemma* = crown. The covered crown Hoya. Containing at present only one species. A branching small epiphyte with urceolate flowers on short peduncles and pedicels, almost sessile. The corolla lobes are reflexed, with the corolla 5-fid cut to above the middle. The crown is upright and with bifid outer lobes as in the Section Sperlingia (Vahl) Miquel (Acanthostemma). The pollinaria have winged translator arms. The translators are attached low down on the retinaculum. The stigma (styler head) is columnar with a nipple-like apex. Key features are:

1. Crown covered by corolla (corolla urceolate)
2. Flowers small
3. Peduncles and pedicels very short almost sessile
4. Corona upright
5. Corona scales bilobed as in Acanthostemma
6. Translator arms winged, attached low down on retinaculum
7. Stigma head (style) columnar apex nipple-like

Acanthostemma (Bl.) Kloppenburg. *Acanthus* = a thorn and *stemma* = crown. Thorny crowned hoyas. This section has small pubescent ball shaped flowers with (revolute corolla) flowers looking much like those of the Section Otostemma. Most have geotropic umbels which are concave or flat. The calyx is small, the gynostegium short adnate. The apex of the corolla lobes are bare and hidden in the revolute fold, difficult to discern in herbarium material. The corona is upright to very upright, with a tooth-like inner apex and blunt outer apex, the lateral sides of the scales are shelfed and extended beyond and often above the outer apex as two ligule-like structures, the lower part of the scale is sulcate

recurved to form a groove. The pollinia have curved translator arms supporting clear caudicles (described as winged). The pollinia are affixed at the base and have a pellucid outer border but not all the way to the caudicles. The styler head (stigma) is apiculate. Sectional characteristics are:

1. Flowers small
2. Corolla rotate, revolute
3. Gynostegium short, adnate
4. Corona segments fleshy, erect
5. Coronal inner angle tooth-like
6. Coronal outer angle with 2 extensions
7. Stigma (styler head) apiculate
9. Flowers often many

The Eriostemma section has now been transferred to Genus status (Eriostemma Kloppenburg & Gilding) 2001.

Eriostemma Schlechter. *Erio* = wool and *stemma* = crown. A woolly crowned hoya. This section is so distinctive and has so many sharp differences from other hoyas that it has been proposed to make it into a subgenus of *Hoya* (Schlechter) or even a distinct genus in its own right (Dr. Ken Hill). With this in mind the diagnostic features are as follows:

1. Stems and leaves with soft short hairs
2. Gynostegium stands on a column
3. Column covered with shaggy cotton-like hairs
4. Corolla with distinct collar
5. Large flowers
6. Thick hirsute calyx
7. Branches soft and fleshy
8. Peduncles extraordinarily thick and soft
9. Flowers hairy and fleshy
10. Pollinia club shaped with no pellucid border
11. Translator arms long, twisted
12. Retinaculum large

Cathetostemma (Blume) Miquel, from *cathetus* = perpendicular and *stemma* = crown. Perpendicular crowned hoya. The drawing in Museum Botanicum Lugduno-Batavum 1 (1849) 59 tab.13 shows a very upright crown with a bifid outer apex. The pollinia are ellipsoidal and do not show the distinct pellucid margin (sterile keel). They are similar in appearance to those of Section Eriostemma Schlechter. It definitely does not have a long narrow pellucid edged pollinia as in Section Centrostemma (Bl) Hooker. Pollinia are basely attached to the retinaculum by translators, whereas those in Section Centrostemma are laterally attached. No species of the Centrostemma I have examined has this type of

pollinarium. The calyx depicted here is very small in relation to the corolla or crown. Sectional characteristics are:

1. Corolla reflexed
2. Gynostegium short
3. Corona scales sickle shaped
4. Corona scales erect, fleshy; convex
5. Corona scales at base bifid
6. Stigma (styler head) umbonate
7. Leaves glabrous, leathery
8. Umbels of many flowers
9. Peduncle short
10. Pedicels long
11. Flowers often very large (yellowish)
12. Pollinia basely attached

Rudimentalia Kloppenburg *rudimentum* = a beginning (transitional pollinia type, rudimentary). Glabrous leaved hoyas, sometimes dimorphic or effected by formic acid from ants, with many flowered umbels, flowers large, glabrous, shiny, corollas deeply cut, tubes short, lobes reflexed; corona leaflets erect, large triangular conic, on the lower surface deeply sulcate; pollinia compressed, short ovate, sterile pellucid margin rudimentary, almost lacking, retinaculum large broad, translators cone shaped, staminal head obconic.

1. Leaves fleshy, glabrous
2. Foliage often modified (formic acid)
3. Flowers large, many
4. Corolla deeply lobed, reflexed
5. Tube short
6. Corona erect, large
7. Corona deeply sulcate below
8. Pollinia broad, ovate
9. Sterile (pellucid) edge rudimentary
10. Retinaculum short broad, prominent
11. Styler head obconic

Centrostemma (Decaisne) Hooker f.. *cento* = a point and *stemma* = crown (a pointed crown) *Hoya multiflora* Blume the Type is such a distinctive species that one should have no difficulty placing species into this section. It is so distinct that some taxonomists have felt it should be a genus in its own right and thus not be incorporated into the Genus *Hoya* R. Brown. Note: J. D. Hooker in his "Flora of British India" apparently misspelled Bennett's *Cyrtoceras cyrto* = arched *cerae* (*cer*) = a horn (arched horn) as *Crytoceras* while placing it as a *hoya* section. Sectional characteristics:

1. Corolla rotate, reflexed
2. Gynostegium with prominent beard about base
3. Gynostegium elongated
4. Corolla inner lobes overtopping gynostegium
5. Coronal scales fleshy, erect
6. Coronal scales at base horn-like or with apex tooth-like
7. Leaves glabrous, leathery
8. Peduncles short
9. Umbels, many flowered & often large on long pedicels
10. Stigma (styler head) dome shaped

Ancistrostemma Hooker, *Ancistros* = a fish hook and *stemma* = crown. Hook-crowned hoyas. To date only one hoya species falls into this section (*H. edeni* King). The name was created as a sectional designation and not first as a genus as with many of the other sections. Sectional characteristics are:

1. Corolla reflexed
2. Corolla lobes longer than broad
3. Column sessile
4. Corona gibbous
5. Coronal scales below 2 lamellate
6. Coronal scales inner lobe extended upward, erect
7. Corona inner lobe bifid, incurved, hooked

Pterostelma (Wight) Hooker. *Ptero* = winged and *stelma* = crown "winged crown" (leaflets of corona membranaceous). Both Blume in Rumphia 4 (1848) 32 and Wight's description say "corolla rotate" with no mention of the corolla being reflexed, and the same holds true for the Type description of *Hoya acuminata* Benth., however, by the time J. D. Hooker in the Flora of British India 4 (1885) 53 describes the *Pterostelma* section he adds "corolla reflexa". This is true of the section *Plocostemma* but should not be in this sectional description. ((The coronal scales (foliola) are reflexed but not the corolla)). Both the drawing of *Pterostelma albiflorum* (Rumphia tab.188) and Schlechter's drawing of *Hoya calycina* show the calyx lobes as large and in *H. calycina* also pubescent. (neither of these species have reflexed corolla). The distinguishing features are thus:

1. Corolla rotate
2. Corolla lobes longer than broad, linear-lanceolate
3. Corolla tube pilose
4. Corona scales membranaceous
5. Corona scales, sides reflexed
6. Corona subulate erect (folded in the middle like a butterfly's wings)*
7. Corona scales broad

8. Dorsal not lateral attachment of the pollen masses to the retinaculum (corpusculum)
9. Sepals of the calyx large
10. Stigma (styler head) apiculate
11. Flowers conspicuous (large)
12. Pedicels equal
13. Coronal scales ovate
14. Caudicles (translators) unwinged
15. Mesophyll differentiated
- 16.

Note: characters 12-15 are from Dr. K.D. Hill's additional observations.

* See Schlechter's drawing of *H. calycina* on p.65 (from the Berlin type sheet) in Hoyas of Northeastern New Guinea 1992 - ORCA Pub. Co.. This shows the folding of the corona and other details. It is clear also, as Dr. Hill stated that the *H. australis* complex belong here. In Rumphia 4 (1848) 33 Blume placed *Hoya albiflora* Herb. Zipp. as *Pterostelma* Wight; P. (*Rhytistelma*) *albiflorum*, thus in a section (non *Hoya*) *Rhytistelma*. Fig. 88 shows a hoya with rotate corolla but with no flowers showing reflexed corolla, most possibly still in the process of opening.

Physostelma (Wight) Blume, from *Physa* = a bladder and *stelma* = a crown (leaflets of crown inflated). This can be combined with the section *Cystidianthus* (Hasskarl) King & Gamble (1843). The umbels of few large flowers are borne on long peduncles. Under section *Cystidianthus* we find the additional key character (not mentioned in *Physostelma* Wight) "corolla somewhat campanulate" and that the corolla margins are undulate; "at first spreading then reflexed". Wight says "stigma convex and blunt". Schlechter emphasizes the "bell shaped" corolla and that 2 sections might be needed to separate the broad coronal types from those whose coronal lobes are laterally compressed. (e.g. *H. epedunculata* Schlechter from *H. campanulata* Blume). Blume's *Physostemma* also seems to belong here. He says coronal scales "sub inflated" and that the margins are revolute with a gaping longitudinal fissure (sulcation). In summary the salient features are: (W=Wight, S=Schlechter, H=Hasskarl, B=Blume, K=Hill).

- 1.W Corolla margins rotate later reflexed
- 2.W Bladder-like corona (inflated)
- 3.W Large flowers
- 4.W Few flowers
- 5.W Long peduncles
- 6.W Flattened Stigma (styler head) somewhat sunken in center
- 7.HS Bell shaped campanulate corolla
- 8.S Calyx small
- 9.S Corona small in relation to corolla
- 10.H Exterior angle of corona scales rising
- 11.B Corona with gaping longitudinal fissure below

- 12.K Pedicels equal
- 13.K Caudicles (translators) unwinged
- 14.K Mesophyll strongly differentiated

Oreostemma Schlechter. *Oreo* = a mountain and *stemma* = crown. A mountain crowned hoy. A section originated by Dr. Schlechter as such and not first as a genus. Its type species is *H. oreostemma* Schlechter. Dr. Schlechter felt it might possibly fit in the *Pterostelma* section but for the very small calyx and the fact that the outer lobe of the coronal scales stand up vertically (almost columnar) and the inner ones taper off in a line almost perpendicular to the tip. Thus the sectional characteristics are:

- 1. Calyx very small
- 2. Corona scales almost columnar
- 3. Corona scales outer lobe stand up vertically
- 4. Corona scale inner lobe tapering to a thin line almost perpendicular at tip
- 5. Corona scale inner lobe ca. 1/2 as high as body
- 6. Corolla strongly reflexed

Plocostemma (Blume) Miquel, from *ploco* = a bladder and *stemma* = crown. Bladder-crowned Hoya. Dr. Schlechter's *H. piestolepis* and *H. hypolasia* were both placed in this Section. They seem to belong here based on the coronal scale formation and the recurved corollas. Dr. Schlechter, however, has not drawn the stigmas so we do not know if these two species have the distinctive apiculate stigmas mentioned and also depicted in Mus. Bot. Lugd.-Bat. 1:60 fig.14. (*Pl. lasianthum* Bl.). This drawing, if accurate, also depicts a very distinctive prominent attachment of the pollinia to the translators. Burton in Hoyan 13 (1991) 28 states "*H. cumingiana* Decne." is a Plocostemma. This species does not fit the Sectional characteristics in a number of key respects. Its coronal lobes are entirely different in shape, not laterally compressed, but rather broad in the middle, and not overly upright. The corolla is not densely woolly. The translators are very small at the attachment point. Most of all, however, *H. cumingiana* Decaisne has a very distinctive ornate capitate head to the styler (stigma) head. I feel it more nearly belongs in Section Cathetostemma (Bl.) Miquel. The Sectional characteristics:

- 1. Corolla densely woolly esp. near base
- 2. Corolla spread or reflexed
- 3. Corona upright
- 4. Coronal scales fleshy, inner apex tooth-like
- 5. Coronal scales laterally compressed
- 6. Gynostegia adnate, somewhat sessile
- 7. Coronal scales below folded upon self
- 8. Calyx small
- 9. Many flowered
- 10. Stigma apiculate

Amblyostemma Kloppenburg from *amblyo* = blunt and *stelma* = crown. The blunt crowned hoyas.

Very vigorous growth, large glabrous foliage with revolute edges to the leaves. Short glabrous peduncles and pedicels. Flowers medium large, many per umbel. Corolla glabrous outside densely puberulous inside with revolute lobes. Crown with short blunt outer apices, scales above concave with an umbo; exuding a colored honeydew which stains the pubescence of the corolla. Staminal column very short, staminal head apiculate.

Sectional characteristics:

1. Large glabrous foliage
2. Leaf edges revolute
3. Flower size medium large
4. Many flowers per umbel
5. Corolla revolute, inside densely pubescent
6. Outer corona lobes blunt
7. Scales above concave with umbo
8. Exuding a colored honeydew
9. Styler head apiculate

Hoya: the original descriptions are very brief, so with few clear characteristics, the section has become the "dumping ground" for many *hoya* species. Further sections should be added to more clearly distinguish those species in this "dumping ground". Sectional characteristics:

1. Leaves fleshy
2. Corona furrowed below (sulcate or channeled)
3. Staminal corona approximating horizontal
4. Flowers large
5. Corona scales flat above or slightly cupped
6. Corona scales, outer end acute
7. Calyx small
8. Pedicels equal
9. Corona with slight median ridge
10. Caudicles (translators) unwinged
11. Mesophyll weakly differentiated or undifferentiated.

Note: characters 9-11 are from Dr. K.D. Hill's additional characters. I have added 3-7.

IX. Some Representative Species From Each Section

Section **Peltostemma** Schlechter:

- H. imbricata Decaisne
- H. maxima (Karsten) Koorders
- H. pseudomaxima Koorders

Section **Otostemma** (Blume) Miquel

- H. lacunosa Blume
- H. obscura Elmer ex Burton
- H. brittonii Kloppenburg

Section **Skenostemma** Kloppenburg

- H. heuschkeliana Klopp.

Section **Kloiphora** King

- H. curtisii King

Section **Acanthostemma** (Blume) Kloppenburg

| | |
|----------------------------------|-----------------------------|
| H. bilobata Schlechter | H. micrantha Hooker f. |
| H. burtoniae Kloppenburg | H. microstemma Schlechter |
| H. gracilis Schlechter | H. panchoi Kloppenburg |
| H. gigantanganensis Kloppenburg | H. picta Miquel |
| H. hasseltii Miquel | H. plicata King & Gamble |
| H. inconspicua Hemsley | H. pruinosa Miquel |
| H. kuhlii Koorders | H. pubera Blume |
| H. leytensis Elmer ex Burton | H. quisumbingii Kloppenburg |
| H. littoralis Schlechter | H. revoluta Wight |
| H. loheri Kloppenburg | H. rizaliana Kloppenburg |
| H. tsangii Burton ex Kloppenburg | H. rumphii Blume |
| H. flavida Forster & Liddle | |

Section **Eriostemma** Schlechter Now Eriostemma species,

| | |
|----------------------------|-----------------------------|
| H. coronaria Blume | H. guppyi Oliver |
| H. ariadna Decaisne | H. affinis Hemsley |
| H. madulidii Kloppenburg | H. hollrungii Warburg |
| H. ciliata Elmer ex Burton | H. gigas Schlechter |
| H. purpurea Blume | H. lauterbachii K. Schumann |
| H. neoguineensis Engler | H. sussuela (Rox.) Merr. |
| H. subcalva Burkill | |

Section **Cathetostemma** (Blume) Miquel

- H. laurifolia Decaisne

Section **Rudimantalia** Kloppenburg

H. darwini Loher
H. mitrata Kerr

Section *Centrostemma* (Blume) Miquel

H. multiflora Blume
H. laurifolia Blume ?
H. platipetala Merrill ?

Section *Ancistrostemma* Hooker f.

H. edeni King

Section *Pterostelma* (Wight) Hooker f.

H. acuminata Wight non Hooker
H. albiflora Zipp. ex Blume
H. calycina Schlechter
H. australis R. Brown ex Trail
H. magnifica Forster & Liddle

H. sana Bailey
H. rupicola Hill
H. oligotricha Hill
H. bicarinata A. Gray

Section *Physostelma* (Wight) Blume

H. collettii Schlechter
H. campanulata Decaisne
H. cystiantha Schlechter
H. betchei Schlechter
H. patella Schlechter
H. megalaster Warburg
H. microphylla Schlechter
H. venusta Schlechter
H. pulchella Schlechter

H. stenophylla Schlechter
H. oligantha Schlechter
H. papuana Schlechter
H. oleoides Schlechter
H. torricellensis Schlechter
H. epedunculata Schlechter
H. rhodostemma Schlechter
H. macgillivrayi Bailey

Section *Oreostemma* Schlechter

H. oreostemma Schlechter
H. poolei White & Francis
H. alata Hill

Section *Plocostemma* (Blume) Miquel

H. lasiantha Korthals
H. blumeana Schlechter (*P. pallidum* Blume)
H. piestolepis Schlechter
H. hypolasia Schlechter

Section *Amblyostemma* Kloppenburg

H. meliflua (Blanco) Merrill
H. diversifolia Blume

H. kerrii Craib
H. obovata Decaisne
H. excavata Teijsm. & Binn.

Section *Hoya*

H. carnosa R. Brown
H. pubicalyx Merrill

X. A chronology as to the Sectional Uses by Different Authors follows:

| | | | |
|-----------|--|------------------------|--|
| 1837 | General System of Gardening and Botany 4 | s.23 (A) G. Don | |
| | 1. | <i>Hoya verae</i> | p.125 with description |
| | 2. | not designated | p.127 with description |
| 1838 | Genera Plantarum (1836-1844) pub. 1841 | Endlicher | |
| | 1. | <i>Hoyae verae</i> | p.596 with description <i>H. carnosa</i> |
| | 2. | <i>Wattahaka</i> * | p.596 with description |
| 1844 | DeCandolle, Prodromus Syst. Veg. 8 | Decaisne | |
| | 1. | <i>Hoyae verae</i> | p.634 with description |
| | 2. | not designated | p.639 with description |
| | 3. | <i>Wattahaka</i> | p.639 with description |
| 1848 | Rumphia 4 | C.L. Blume | |
| | 1. | <i>Hoyae verae</i> | p.30 <i>Hoyae carnosae</i> , described |
| | 2. | <i>Physostemma</i> | p.32 * described |
| 1849 | Museum Botanicum Lugduno-Batavum 1 | C.L. Blume | |
| | 1. | <i>Hoyae verae</i> | p.43 no description |
| | 2. | <i>Physostemma</i> | p.44 no description |
| 1857 | Flora von Nederlandsch Indië 1 | Miquel | |
| | 1. | <i>Euhoya</i> | p.516 with description |
| | 2. | <i>Physostemma</i> Bl. | p.521 with description |
| | 3. | <i>Sperlengia</i> Vahl | p.523 (<i>Acanthostemma</i> Bl.), |
| described | 4. | <i>Otostemma</i> | p.525 with description |
| | 5. | <i>Cathetostemma</i> | p.525 with description |
| | 6. | <i>Plocostemma</i> | p.526 with description |
| 1885 | Flora of British India 4 | J. D. Hooker | |
| | 1. | <i>Cryptoceras</i> | p.52 described |
| | 2. | <i>Pterostelma</i> | p.53 described |
| | 3. | <i>Ancistrostemma</i> | p.53 described |

| | | |
|------|--|-----------------|
| 4. | Euhoya | p.53 described |
| 1895 | De Naturl. Pflanzenfamilein 4 (Engler's) | K. Schumann |
| 1. | Cyrtoceras | p.289 described |
| 2. | Ancistrostemma | p.289 described |
| 3. | Pterostemma | p.289 described |
| 4. | Euhoya | p.289 described |

*Now considered *Dregia* Meyer nom. cons. or by some *Wattakaka* Hassk. by others.

| | | |
|------|--------------------------------|-----------------|
| 1901 | Flora of the Malay Peninsula 2 | King & Gamble |
| 1. | Cyrtoceras | p.559 described |
| 2. | Pterostelma | p.559 described |
| 3. | Kloiphora | p.559 described |
| 4. | Euhoya | p.559 described |
| 5. | Cystidianthus | p.561 described |

| | | |
|------|-----------------------------|--------------------------|
| 1912 | Exkursions Flora von Java 3 | S.H. Koorders |
| 1. | Cyrtoceras | p.96 described in key |
| 2. | Euhoya | p.97 described in key |
| 3. | Acanthostemma | p.98 subsection in key * |
| 4. | Ancistrostemma | p.100 described in key |

* Koorders lists this as a untersection (subsection) designated by Miquel in Fl. Ned. Ind., however, Miquel has only placed this in a section (#3) into synonymy with Sperlingia, and not as a subsection. In addition Koorders quotes this on p.525, however, it is on p.523.

| | | |
|------|--------------------------|-----------------|
| 1913 | Botanische Jahrbücher 50 | R. Schlechter |
| 1. | Otostemma | p.105 described |
| 2. | Euhoya | p.105 described |
| 3. | Plocostemma | p.105 described |
| 4. | Pterostelma | p.105 described |
| 5. | Oreostemma | p.105 described |
| 6. | Physostelma | p.105 described |
| 7. | Eriostemma | p.106 described |

| | | |
|------|---------------|-----------------|
| 1988 | Telopea 3 (2) | K. Hill |
| 1. | Hoya | p.244 described |
| 2. | Physostelma | p.224 described |
| 3. | Otostemma | p.246 described |
| 4. | Pterostemma | p.246 described |

| | | |
|------|------------------------------------|--------------------|
| 1994 | Hoya Section Acanthostemma (Blume) | Kloppenburg (1994) |
| 1. | Acanthostemma | p.2 described |

Appendix:

Article 22.1 The name of any subdivision of a genus that includes the type of the adopted, legitimate name of the genus to which it is assigned is to repeat that generic name unaltered as its epithet, but not followed by the authors name (see Art.46). Such names are termed autonyms (Art.6.8; Art.7.2) and must include the type of the adopted name of the genus (i.e. *H. carnosa* R. Br.). Dr. Blume in *Rumphia* 4 (1848), 30 in conjunction with Section 1. *Hoyae verae* used *Hoyae carnosae* (*Hoya carnosa* R. Br.). **The section becomes *Hoya*** (repeating the generic name unaltered) and becomes an "autonym".

Article 32.6 Autonyms (Art.6.8) are accepted as validly published names, dating from the publication in which they were established (see Art.19.4, 22.2, 26.2) whether or not they appear in print in that publication.

Note Article 6.8 Autonyms are such names as can be established automatically under Art.19.4, 22.2 and 22.6, whether they were formally created or not. (Section *Hoya* was not automatically created).

Article 22.2 The first valid publication of a name of a subdivision of a genus that does not include the type of the adopted, legitimate name of the genus automatically establishes the corresponding autonym.

XI. Chronology of Genera Use

Note: Below I have selected the uses of the Generic names, most of which have been incorporated into Genus *Hoya* R. Br. as sections. I do this only to show the sequence of events leading to the formation of the *Hoya* Sections. Chronologically they are as follows:

1810 Skrivter af Naturhistorie-Gelskabet. 6:113-114 Vahl
1. Sperlingia

1834 Contributions to the Botany of India Robert Wight
1. Physostelma Wight p.39
2. Pterostelma Wight p.39

1837 General System of Gardening and Botany V.4 s.23 (A) G. Don
1. Hoya R. Brown p.125
2. Physostelma Wight p.128
3. Pterostelma Wight p.128

1838 Genera Plantarum Endlicher
1. Hoya R. Brown p.595
2. Pterostelma Wight p.596

3. *Physostelma* Wight p.596

1843 *Tijdschrift von Natur. Geschieden* V.10 Hoev. & De Vriesse
 1. *Cystidianthus* Hasskarl p.125

1844 *DeCandolle, Prodromus Syst. Veg.* V.8 Decaisne
 1. *Plocostemma* Blume p.630
 2. *Physostelma* Wight p.633
 3. *Pterostelma* Wight p.633
 4. *Centrostemma* Decne. p.634
 5. *Hoya R. Br.* p.634

1848 *Rumphia* V.4 C.L. Blume
 1. *Acanthostemma* Blume p.29
 2. *Otostemma* Blume p.30
 3. *Cathetostemma* Blume p.30
 4. *Pterostelma* Wight p.32

1849 *Museum Botanicum Lugduno-Batavum* V.1 C.L. Blume
 1. *Hoya R. Brown* p.43
 2. *Centrostemma* Decaisne p.57
 3. *Cathetostemma* Blume p.45
 4. *Cystidianthus* Hassk. p.57
 5. *Plocostemma* Blume p.59

1852 *Annales Botanices Systematicae* V.3 G.C. Walpers
 1. *Acanthostemma* Blume p.64
 2. *Cathetostemma* Blume p.64-65
 3. *Otostemma* Blume p.65
 4. *Hoya R. Brown* p.65
 5. *Plocostemma* Blume p.67

1857 *Flora van Indiaë* V.2 F.A.W. Miquel
 1. *Cystidianthus* Hassk. p.515
 2. *Hoya R. Brown* p.516

1858 *Botanical Magazine, Curtis's*
 1. *Plocostemma* Blume t.5081

1858 *Annales Botanices Systematicae* V.5 C.G. Walpers
 1. *Physostelma* Wight p.505
 2. *Hoya R. Brown* p.505

1860 *Botanical Magazine, Curtis's*

| | | | |
|------|--|---------------------------------|-------|
| | 1. | Centrostemma Decaisne t.5173 | |
| 1876 | Genera Plantarum V.2 | Bentham & Hooker | |
| | 1. | Acanthostemma Blume | p.772 |
| | 2. | Otostemma Blume | p.772 |
| | 3. | Cathetostemma Blume | p.772 |
| | 4. | Plocostemma Blume | p.772 |
| | 5. | Cyrtoceras Bennett | p.772 |
| | 6. | Centrostemma Decaisne | p.772 |
| | 7. | Pterostelma Wight | p.772 |
| | 8. | Physostelma Wight | p.772 |
| 1885 | Flora of British India V.4 | J. D. Hooker | |
| | 1. | Hoya R. Brown | p.52 |
| | 2. | Physostelma Wight | p.62 |
| 1895 | De Naturl. Pflanzfamilien V.4 (Engler's) | K. Schumann | |
| | 1. | Physostelma Wight | p.289 |
| | 2. | Truetleria Hooker | p.289 |
| | 3. | Hoya R. Brown (Sperlingia Vahl) | p.289 |
| 1910 | Systematisches Verzeichnis Java | Koorders | |
| | 1. | Physostelma Wight | p.5 |
| | 2. | Hoya R. Br. | p.5 |
| 1912 | Exkursionsflora, Flora Java V.3 | S.H. Koorders | |
| | 1. | Physostelma Wight | p.96 |
| | 2. | Hoya R. Br. | p.96 |
| 1965 | Flora of Java V.2 | Backer | |
| | 1. | Physostelma Wight | p.265 |

* It should be noted that Blume in *Rumphia* 4 (1844) originally retained the spelling of *Pterostelma* but changed *Physostelma* when designating it as a *Hoya* Section to "Physostemma" p.32.

XII. *Hoya R. Brown:* Chronology of literature references

The following publications, here arranged in chronological order, carry descriptions of *Hoya*.

1809 R. Brown Mem. Wern. Nat. Hist. Society 1:26-27

1810 R. Brown *Prodromus "Florae Novae Hollandiae"* 459

1811 W. Aiton *Hortus Kewensis* ed. alt. 2 :84

1826 C. Blume *Bijdagen tot de Flora van Nederlandsch Indië* (Bijdr. 1825)1062

1834 R. Wight *Contributions to the Botany of India* 29

1837 *Curtis's Botanical Magazine* t.3425

1837 G. Don *General System of Gardening and Botany* 4 s.23 (A),125

1838 S. Endlicher *Gen. Pl.* 3501 3:177, pl.270 & 595-596

1839 Lindley in *Edwards' Botanical Register* 18

1844 Decaisne in *DeCandolle Prodromus Syst. Veg.* 8:634

1845 M. Blanco *Flora de Filipinas* ed.2,142

1848 *Curtis's Botanical Magazine* t.4347, 4397

1848 C. Blume *Rumphia* 4 :29

1848 *Fleur des Serres Ser. I.* 4:310, 393, 399; 6: 579

1849 *Paxton's Magazine* 15:243

1849 C. Blume *Museum Botanicum Lugduno-Batavum* 1:43

1850 *Fleur des Series* 6:143; 8:12

1857 Miquel *Flora van Nederlandsch Indië.* 1:516

1858 *Curtis's Botanical Magazine* t.5081, 5148

1860 *Curtis's Botanical Magazine* t.5173

1869 G. Bentham *Flora Australiensis* 4:324

1876 Bentham & Hooker *Genera Plantarum* 2:775-6

1882 C. Lauerssen *Handbook der Systematic Botany* 1066

1883 Hooker f. *Flora of British India* 4:52

1883 F. M. Bailey *Synopsis of the Queensland Flora* 319

1891 O. Kurtz *Revisio Genera Plantarum* pt. 2

1895 K. Schumann in Engler *De Naturl. Pflanzenfamiliein* 4:288-289

1895 H. Trimen *Handbook of the Flora of Ceylon* 2 pt.3:162

1900 F. M. Bailey *Queensland Flora* pt.3:1012

1901 K. Schumann & K. Lauterbach *Die Flora der Deutschen Schutzegebiete in der Südsee* 512

1901 G. King & J. S. Gamble *Flora of the Malay Peninsula* 2:559

1905 K. Schumann & K. Lauterbach *Nactrage zur Flora der Deutschen Schutzgebeite in der Südsee* 351

1912 S. H. Koorders *Exkursionsflora, Flora von Java* 3:96

1912 J. Costantine in *LeConte Flore Generale des Indo Chine* 4:125

1912 E. D. Merrill *A Flora of Manila* 380

1913 R. Schlechter *Botanische Jahrbücher* 50:104 "Die Asclepiadaceen von Deutsch Neu Guinea"

1918 S. H. Koorders *Flora von Tjibodas* 64

1920 P. F. Fyson *Flora of the Nilgiri & Pulney Hill-Tops* 3:283

1922 H. H. Haines *Botany of Bihar & Orissa* 560-561

1923 H. Ridley *Flora of the Malay Peninsula* 2:369-394

1923 J. S. Gamble *Flora of the Presidency of Madras* 2:848

1927 H. E. Osmaston *A Forest Flora for Kumaon* 356

1927 K. Heyne *De Nuttige Planten van Nederlandsch Indie* 2:1296-1297

1936 W. Tsiang *Sunyatsenia* 3:171

1939 E. D. Merrill *Sunyatsenia* 4:124

1950 R. Bakhuizen van der Brink & C. A. Backer & Van Stennis *Blumea* 6
"Notes on the Flora of Java" 1:378

1960 Paham-Hoang Ho *Flora du Vietnam* 436

1965 C. A. Backer *Flora of Java* 2:266

1965 J. Ohawi *Flora of Japan* 751

1967 J. Ohawi *Flora of Japan* 216,

1973 H. Huber *A Revised Handbook of the Flora of Ceylon* 1:50

1974 M. R. Henderson *Malayan Wildflowers* 229 (reprint ed.)

1976 C. Salanha & D. Nicholson *Flora of Hassan District Karantaka India* 449

1978 R. E. Rintz *Mayan Nature Jour. "The Peninsular Malaysian Species of Hoya"* 3:467

1978 Lu Fu Yuan *Flora of Taiwan* 4:226; 6:238

1983 S. J. Ali *Flora of Pakistan* 150:1

1981 H. Huber in Dassanayake & Fosberg *A Revised Handbook of The Flora of Ceylon* 110

1988 K. D. Hill *Telopea "A Revision of Hoya in Australia* 3:241-244

1990 P. I. Forster & D. L. Liddle *Hoya R. Br. in Australia, An Alternative Classification* *Austrobaileya* 3:217-218

Footnotes:

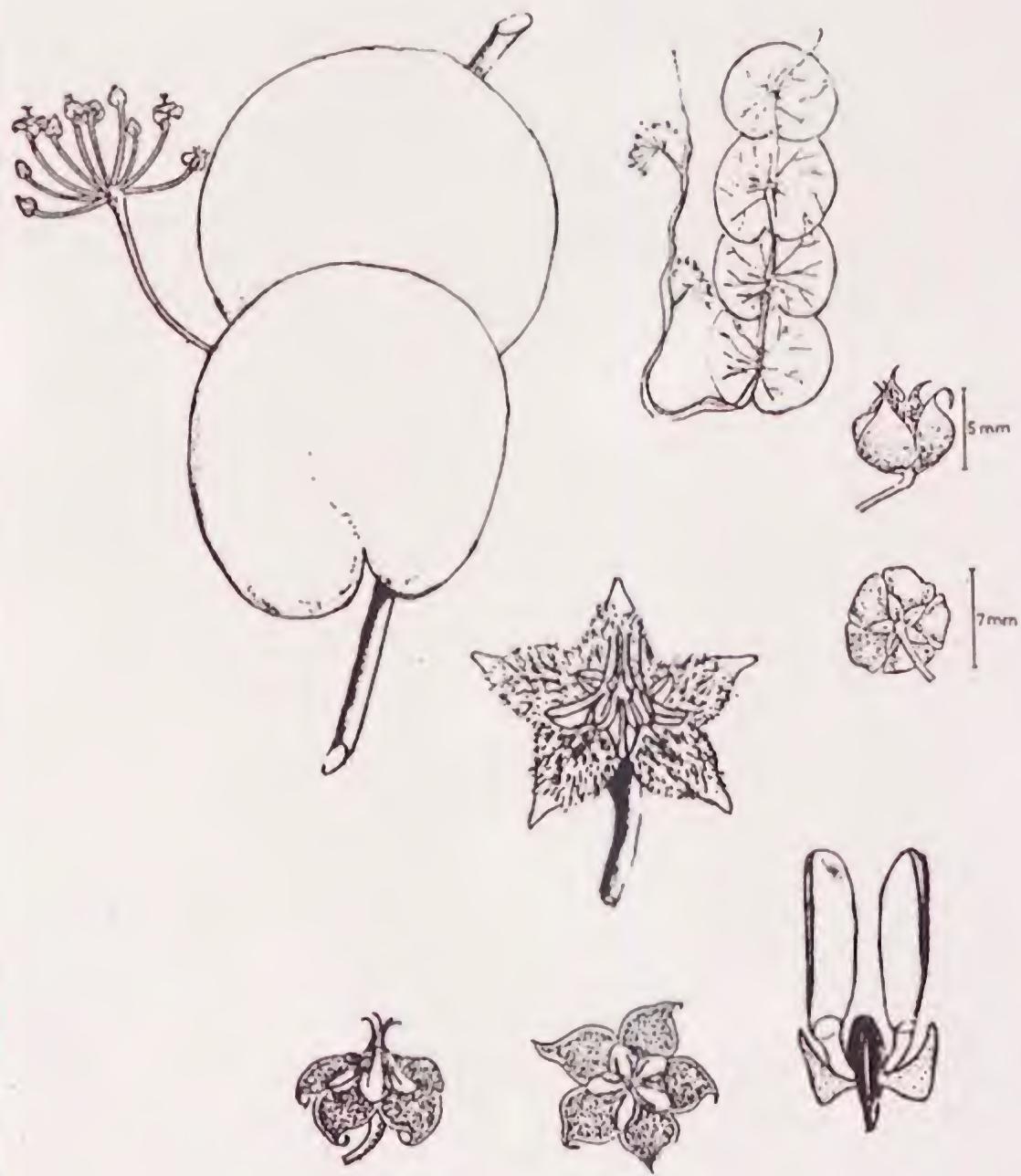
¹ The Greek prefix 'Eu-' (= true) added with or without a hyphen, to the generic name, forms a word which earlier botanists used to indicate the same thing as G. Don intended with his "hoyae verea" i.e. the true, or original, Hoyas. This implies that the original type species and its closest relatives were members of the group so named. (in practice this did not always prove to be the case). Under the current ICBN nomenclature rules such names are illegitimate, and usually prove to be synonymous with the taxon which includes the type species of the genus and which bear, as its name, the generic name itself plus the indication of rank (viz., Section *Hoya*) without indication of separate authorship so as not to confuse it with the Genus.

² There is, it appears no Article in ICBN to cover the changing of the spelling of a genus name lowered to a section as Blume has done with the section "Physostemma". It appears, however, that precedence would dictate that the original spelling be applied.

Part II

Sectional Drawings

Section Peltostemma Schlechter



Hoya imbricata Decaisne

Section *Otostemma* (Blume) Miquel

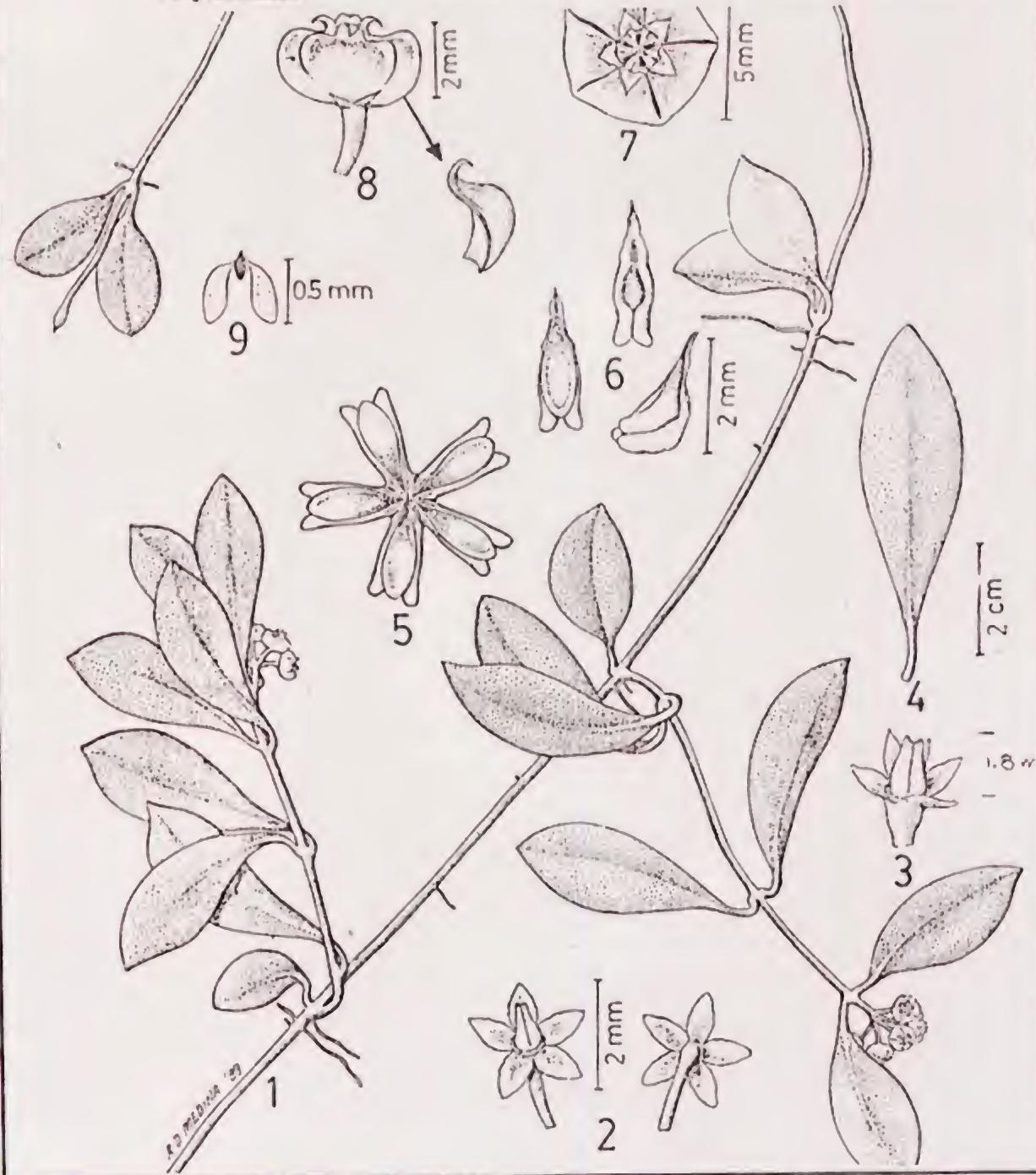


Hoya lacunosa Blume Bottom view of crown

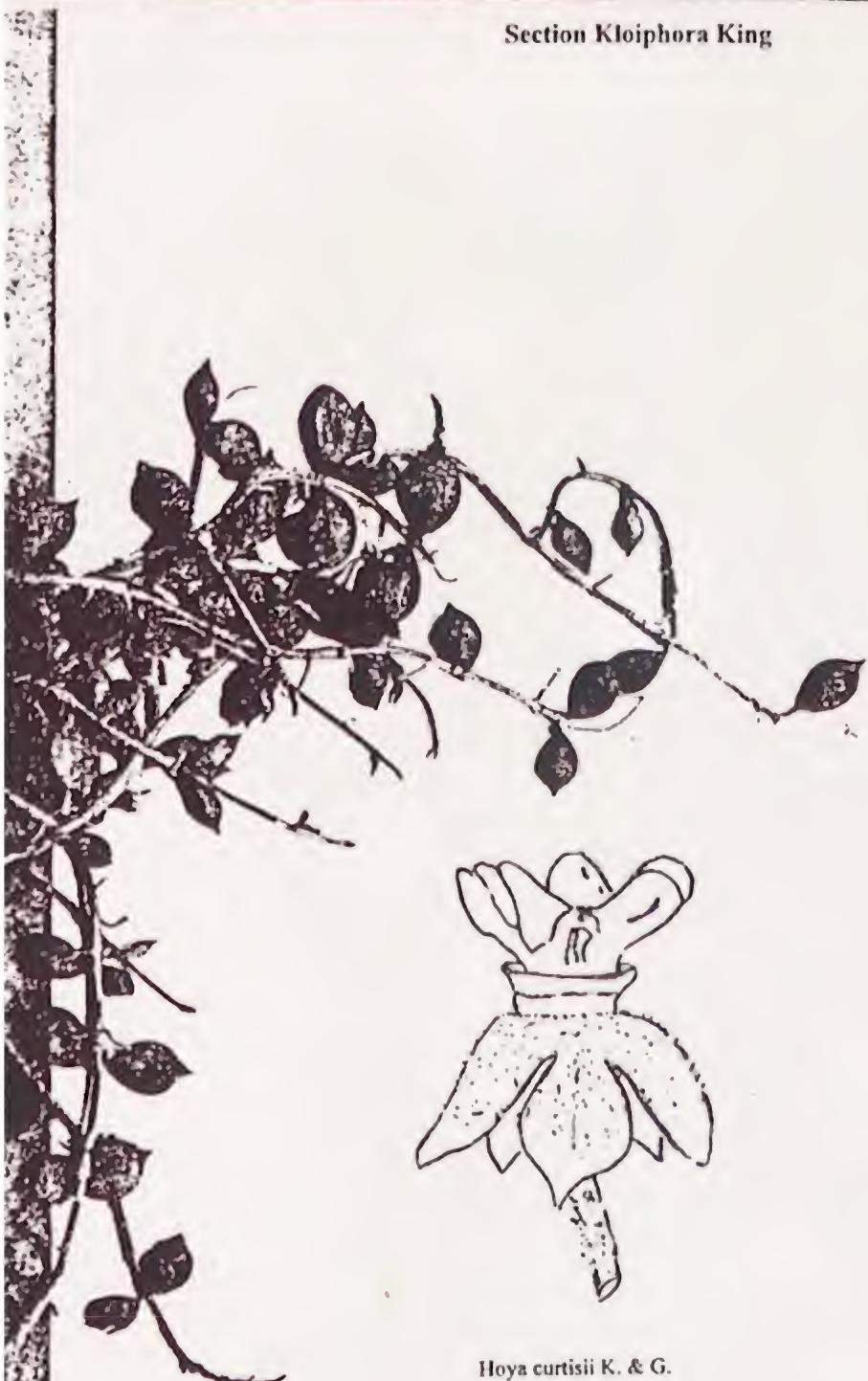
Section Skenostemma Kloppenborg

Hoya heuschkeliana Kloppenborg

1. Flowering stem; 2 & 3. sepals, 3 views; 4. leaf; 5. corona, enlarged; 6. corona scales, 3 views; 7. flower, front view; 8. same, side view; 9. pollinia.



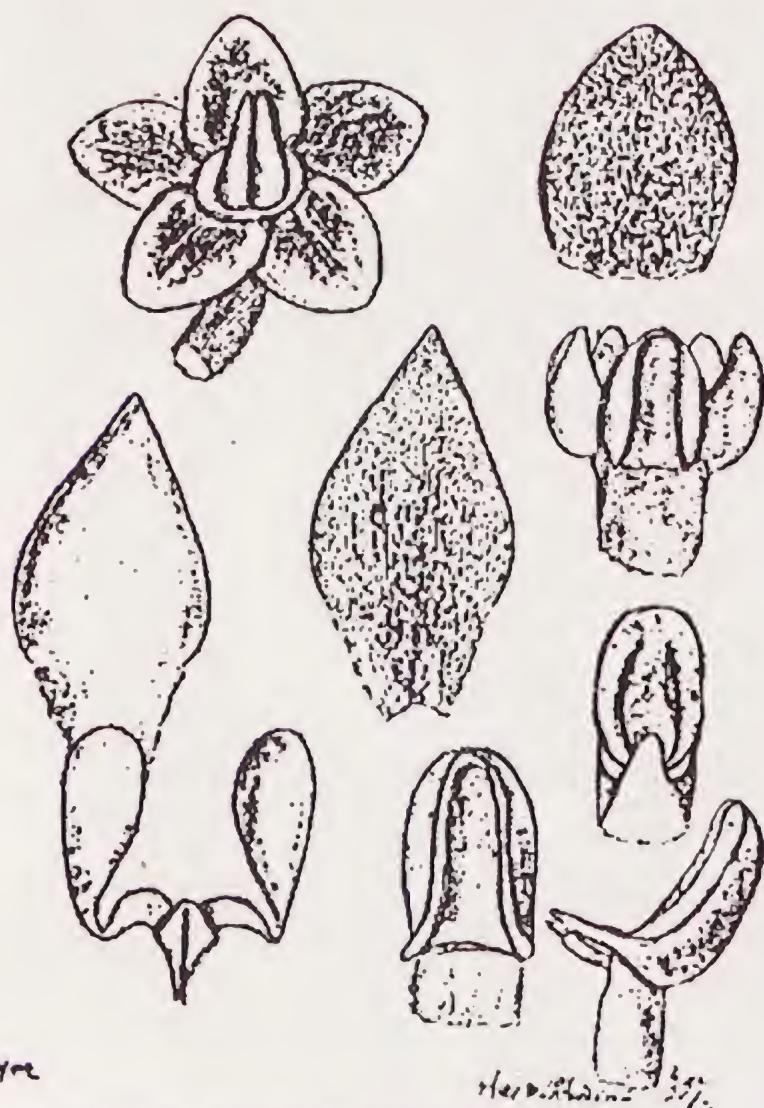
Section Kloiphora King



Hoya curtisii K. & G.

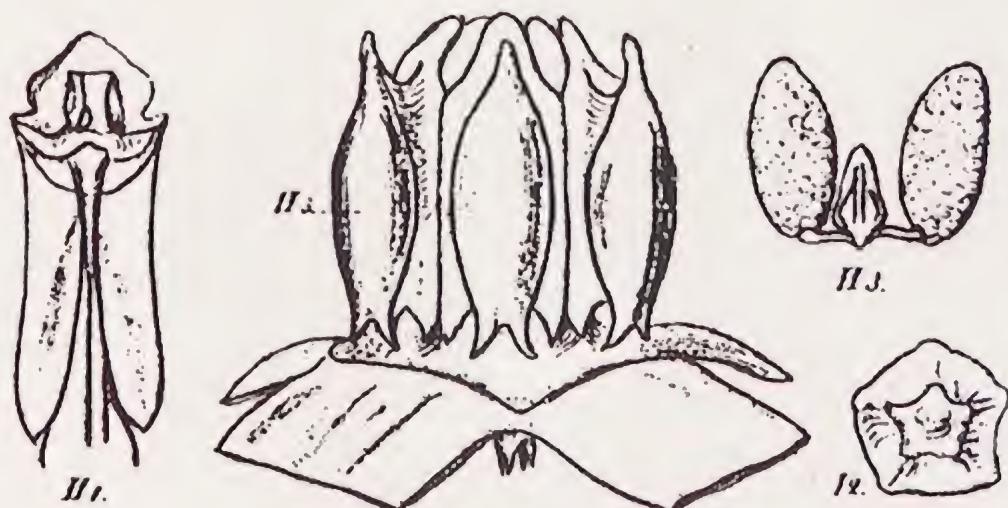
Section Eriostemma Schlechter

Genus *Eriostemma* Klopp. + Gilding
2001



Hoya madulidii Kloppenborg from Schlechter's Herb. sheet

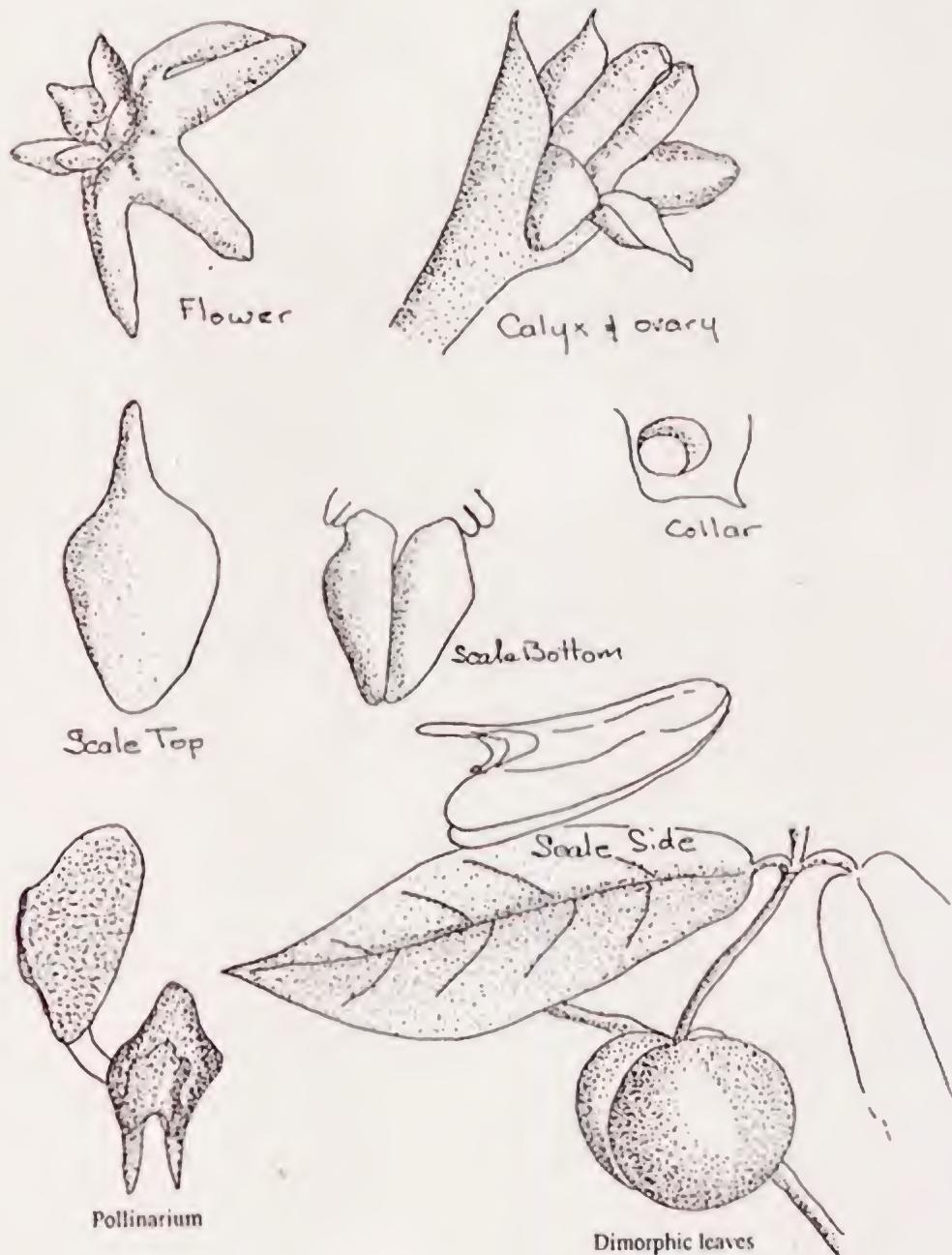
Section Cathetostemma (Blume) Miquel



Cathetostemma laurifolium Bl.

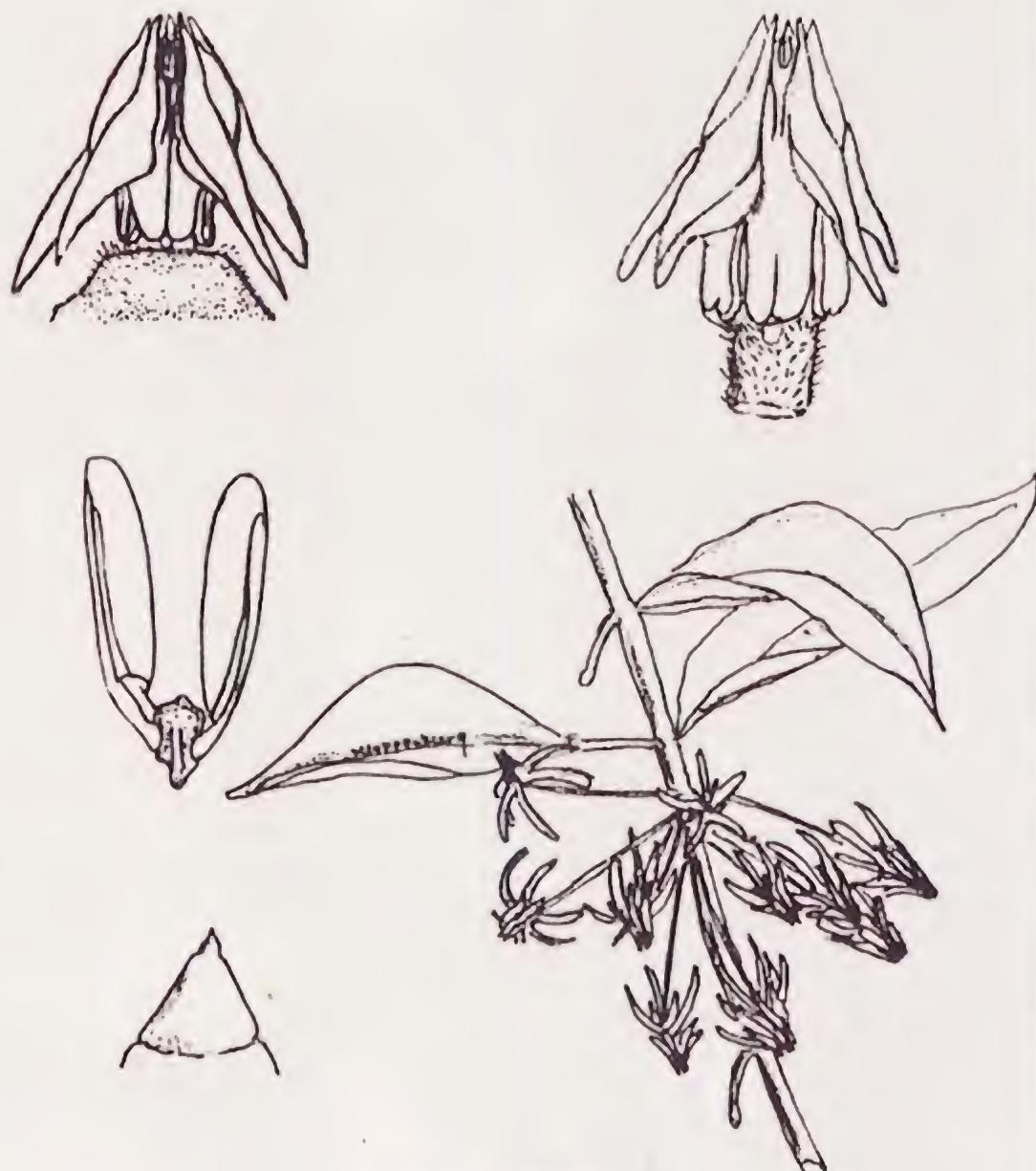
from Blume "Mus. Bot. L-B V.1 p.60 t.14

Section Rudimentalia Kloppenburg



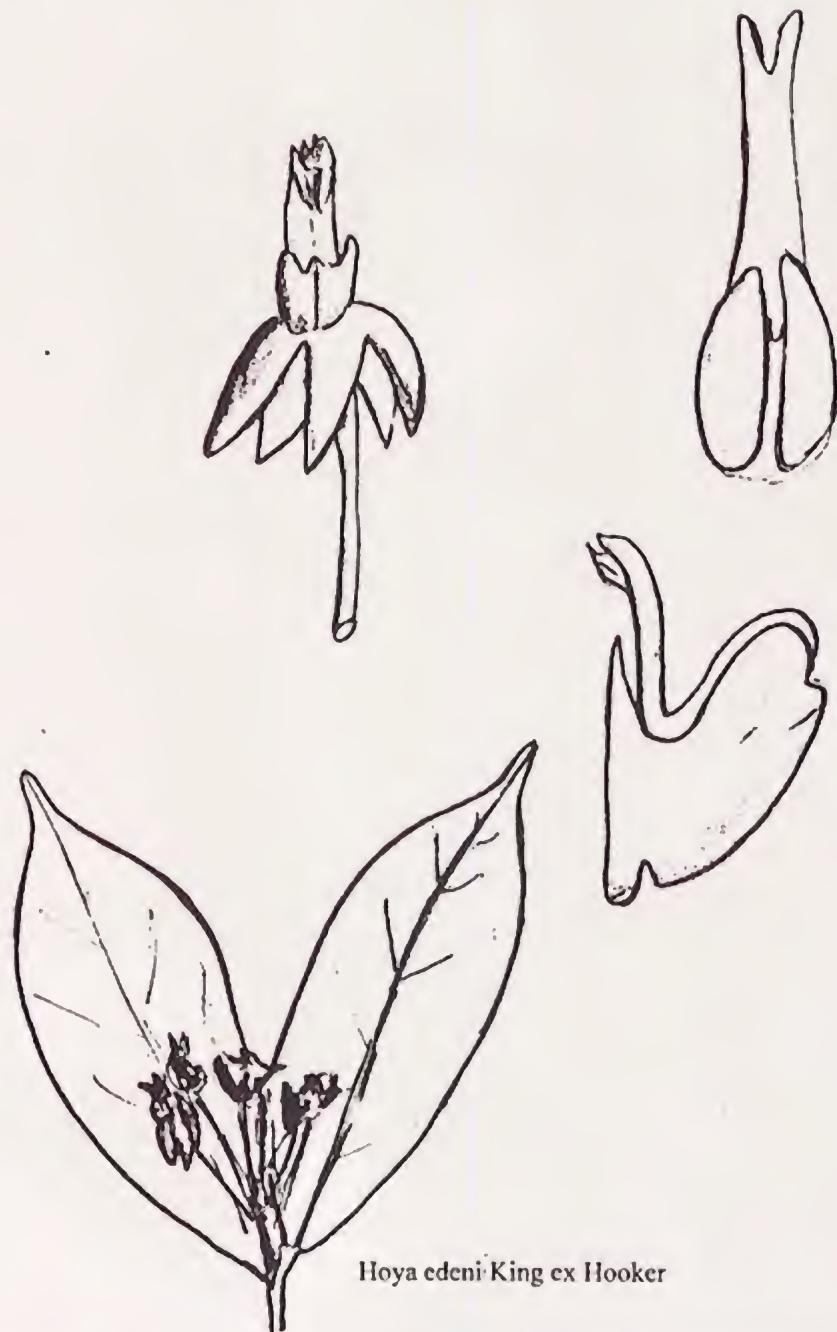
Hoya darwinii Loher

Section Centrostemma (Blume) Hooker



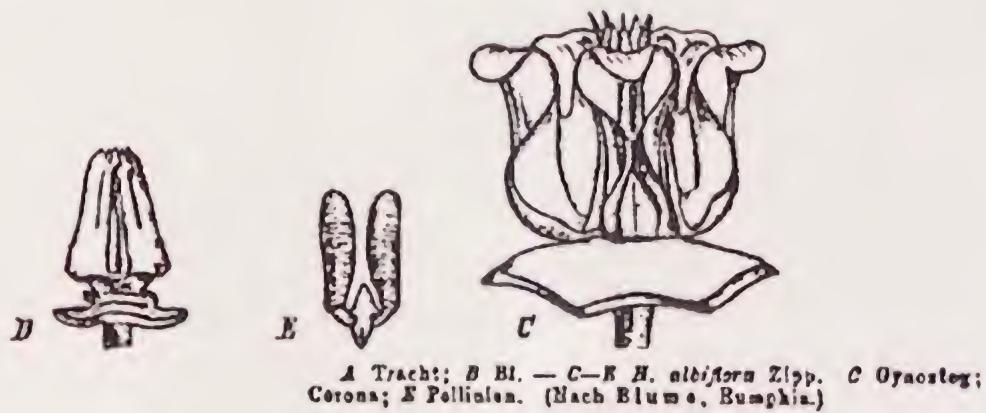
Hoya multiflora Blume

Section *Ancistrostemma* Hooker



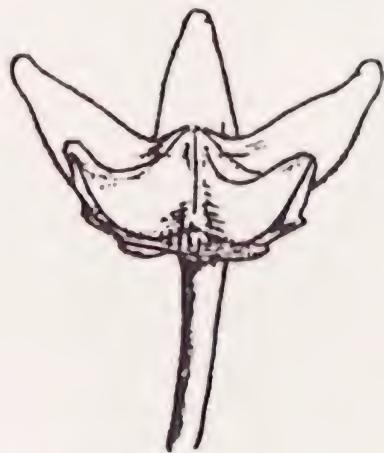
Hoya edeni King ex Hooker

Section Pterostelma (Wight) Hooker

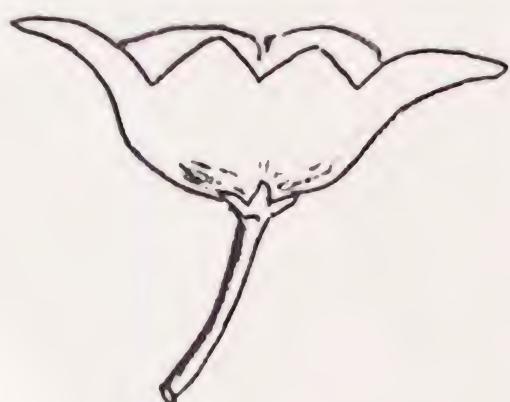
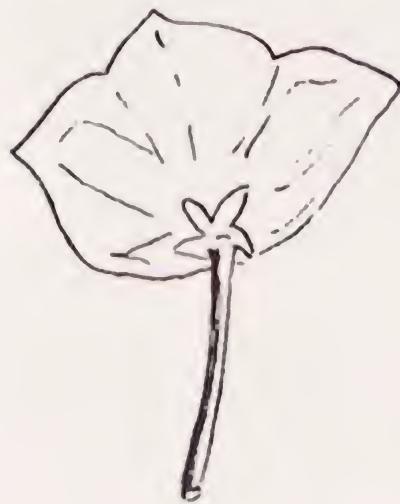


Hoya albiflora Zipp. Engler & Prantl.

Section Physostelma (R. Wight) Blume

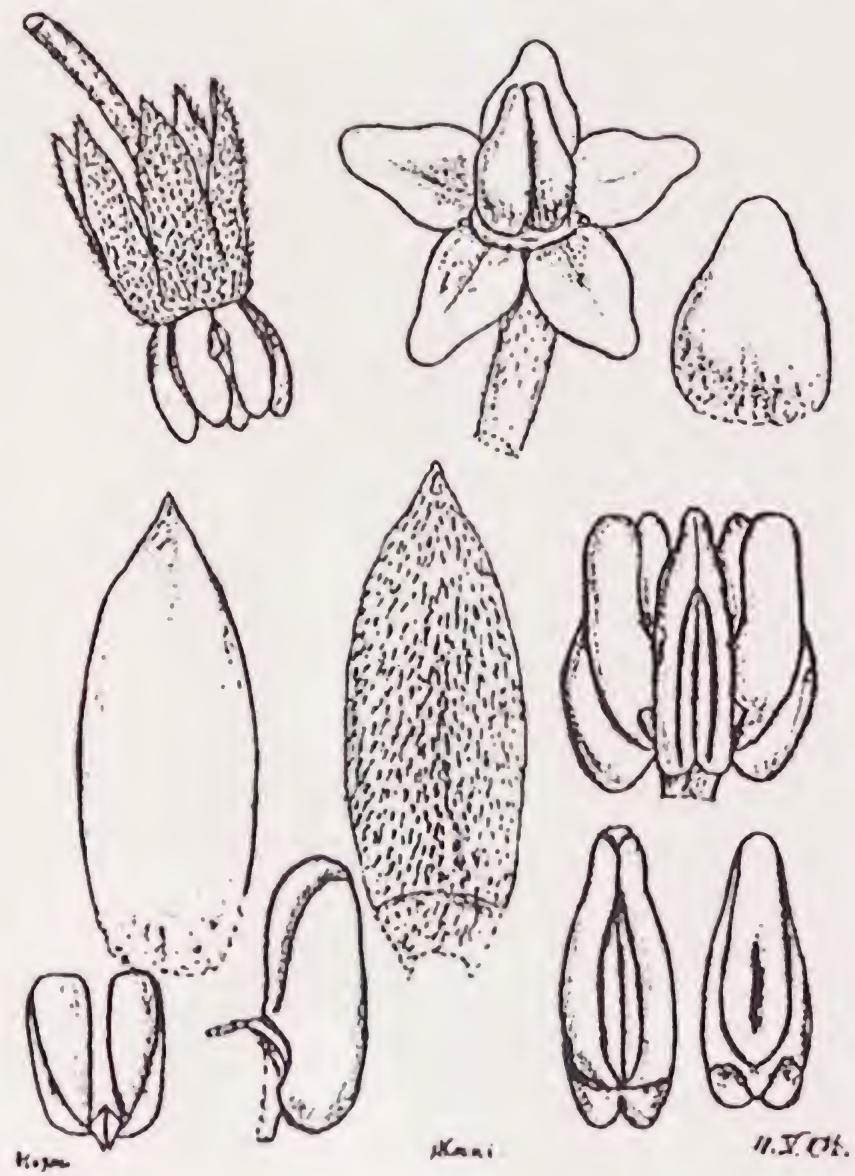


Hoya campanulata Blume

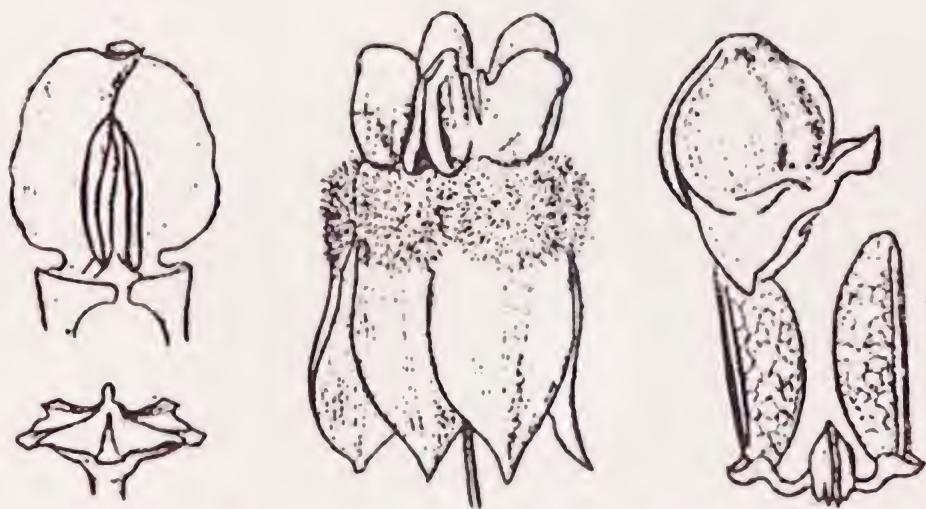


Section Oreostemma Schlechter

Hoya oreostemma Schlechter from Bot. Jahr. V 50



Section Plocostemma (Blume) Miquel



Plocostemma lasianthum Bl.

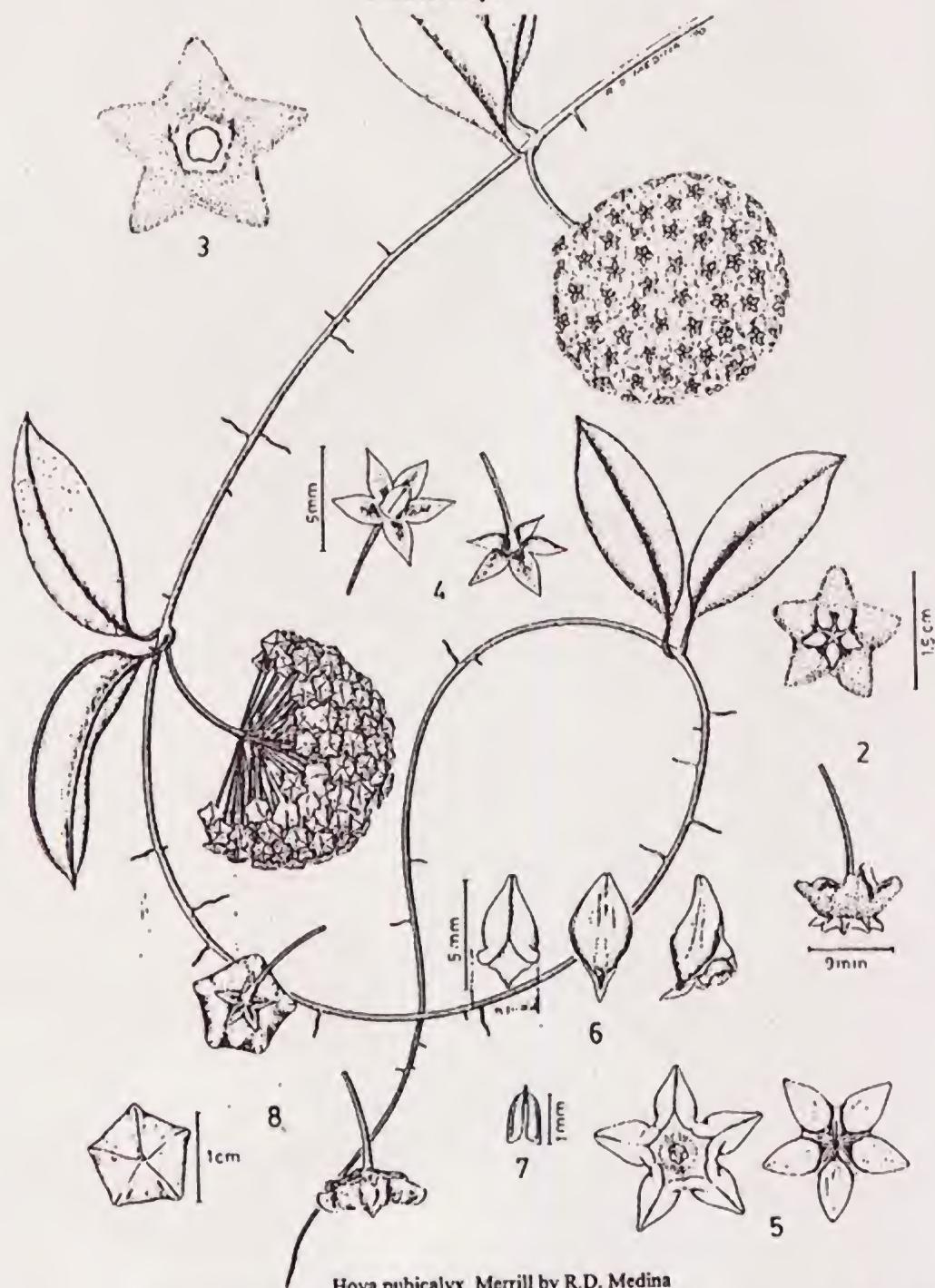
from Blume "Mus. Biot. L-B V.1 p.59 t.13

Section Amblyostemma Kloppenburg



Hoya metaflua Merrill. Syn. *Hoya fraterna* Blume

Section Hoya



Hoya pubicalyx Merrill by R.D. Medina

Hoya pubicalyx: 1. Flowering stem; 2. flower, front view & side view; 3. petals; 4. sepals, front & back view; 5. corona, front & back views; 6. corona scales, 3 views; 7. pollinia; 8. young flower, 3 views.

XIII Appendix

Recent changes

Genus Eriostemma (Schlechter) Kloppenburg & Gilding

Eriostemma (Schlechter) Kloppenburg & Gilding genus nova. Type; *Eriostemma coronaria*, (species *Hoya coronaria* Blume), in Bijlagen tot de Flora Nederlandsch Indie (Bijdr. 1825) 1063. Type description: C. L. Blume. *Hoya coronaria*, Bl. H. foliis aveniis ovalibus acutis margine recurvis coriaceis infra villosis, corollis glabris (*Corona Ariadna*, Rumph. Herb. Amb. V. t. 172). (1064).

Crescit: in montanis et ad ripas circa Rompien.

Floret: per totum annum.

Nomen: aroy Kilampahan.

Translation: leaves veinless oval acute with margins recurved, leathery, beneath villose, corolla glabrous. (*Corona Ariadna* in Rumphia Herbarium Amboinensis 5. t 172). 1064.

Growing: in the mountains and frequently on the stream banks around Rompien. Flowers the entire year. Local name “Aroy Kilampahan”.

In establishing Section Eriostemma, Dr. Schlechter in Botanische Jahrbücher 50 (1913) 106 & 137 (translated for the German as follows:

Translated from the German 106:

Section VII. Eriostemma the stems and leaves with all surfaces (parts) covered with short soft hairs; in other respects its blooms possess marked sharp characteristics. The gynostegium stands upon a column, which goes down into the crown of the collar of the corolla that is covered with shaggy cottony hairs. The corona scales are comparatively short. The blooms are large or very large with a well-developed thickly hirsute calyx. Type species of the Section is *H. coronaria* Blume.

Translated from 135:

Section VII. Eriostemma Schlechter. I thought it best to present here this distinctive section *Eriostemma*. This section is so well and sharply different, that one could consider whether or not to regard it as a separate sub-genus. I have so far presented above briefly the main points, but now I wish to present them once again in more detail. In habit there is a strong similarity that can be found with *EU-Hoya*, but the branches are softer and more fleshy and consistently with more or less soft hairs. The peduncles are extraordinarily thick and soft textured, the calyx as with *Pterostemma* more strongly structured, and the large hairy blooms are likewise fleshy. The gynostegium with the

corona scales stand upon a woolly matted column that is the outgrowth formed of the filaments, which are united with the corona tube. The pollinia are distinguished (marked) as opposed to the other *Hoya* species by means of the fact that the translators have undergone a strong development and exhibit a twist; also the retinaculum is rather large. The pollinia are more club shaped and moreover do not have the keel on the outer edge, characteristic of other *Hoya* sections.

We for a long time now have been aware that the species in this section have very little in common with the Genus *Hoya* and so have made the decision to place it into the Genus *statis*. In addition to the differences noted by Dr. Schlechter above, the characters of the Genus *Eriostemma* (Schlechter) Kloppenborg and Gilding are as follows:

By Edward Gilding:

Stems slightly fleshy, 3-10mm thick. All parts exude milky sap when injured. Leaves and stems covered with pubescence except in a few species, in which case the plant possesses a notable covering of indumentum on young growth but becomes glabrous when mature. Stems and the upper leaf surface are of the same color. No noticeable red pigment in young vegetative shoots. Stems twining or prostrate, supple when young, later becoming lenticelate and finally with corky bark. Petiole always developed but short, 1-5cm in length, round in cross section or nearly so without a channel on the upper surface. Leaves fleshy, 2-5mm thick, succulent, opposite in whorls. Leaves faintly glanduliferous on upper leaf surface where it is attached to the petiole. Leaf shape obovate, oblong, or elliptic, but always apiculate at the apex with recurved margins. Nerves always pinnate, sometimes not visible in fresh state. Inflorescence consists of a short peduncle that is of the same thickness and texture of the stem, the end developed into an extremely compressed panicle. Peduncles are either persistent, flowering numerous times or deciduous and flowering only once. Flowers are produced in clusters from the end of the peduncle in numbers from one to twenty but with a mean of six. Pedicels range from 2-15cm in length, thick and supple occasionally pubescent. Calyx of five large lobes usually spathulate, adnate to corolla. Corolla always valvate, thick and rigid. Inside of corolla is ceraceous, being glabrous to densely villose. Lobes of the corolla short to elongate. Corolla lobe posture variable between species from recurved to flat or incurved. Tube short or non-existent, when present it is patellate to cupulate. Base of corolla beneath corona is unique, abruptly cupulate and adnate with column of corona, sericeous in all species. The corona column is also sheathed with corolla tissue that is densely sericeous in all species. Color of corolla ranges from white to green-yellow or orange to deep dull red-brown. The structure forms a deep inverted annulus from which nectar is produced. Corona lobes simple inornate, inner (central) lobe acute and laterally flattened. Outer lobe broad also inornate erect to flat but always broadly obtuse. Usually yellow or yellow with red areas, rarely all white. Pollinaria have rhomboidal retinaculum, with the unique character of twisted translator arms, pollinia always flask- 'like in shape without obvious pellucid edge frequently found in *Hoya* Br Follicles large, elongate to 35cm and thick in cross-section to 5cm. Outside pubescent or glaucous, mamillate at apex. Unique character of well developed spongiform mesocarp. Seed number 250 to 450 per follicle, freshly ochre-white in color but becoming dull green-blue with age, comate.

Specialized terminology to describe structures of *Eriostemma*:

Exterior Corolla — Corolla tissue that is on the outside of the bloom.

Inner Corolla — Corolla tissue which folded upon itself to form an deep indented annulus.

Operculum — The edge around the base of the visible corona, made of corolla tissue.

Outer Corolla — The portion of the corolla that is not folded upon itself and is generally visible from above, note that this is different from the Exterior Corolla.

| Anatomical Feature | Eriostemma Characters | Hoya Characters |
|--------------------|---|---|
| Habit | Usually Terrestrial. | Almost Never Terrestrial. Epiphytic. |
| Stems and Petioles | Mostly Pubescent, Usually Green in Color, young shoots never with high anthocyanin content. | Occasionally pubescent, often aging to brown-tan, young shoots often with high anthocyanin content. |
| Leaves | Never Flecked, Always Green with pinnate veins and thick in texture. | Occasionally flecked, either palmate or pinnate veins and sometimes thin textured. |
| Peduncles | Of equal thickness to adjoining stem. Usually short and blunt. | Variable thickness, variable length between species. Generally more slender than those of Eriostemma. |
| Pedicels | Of equitable length to peduncle and to other pedicels. | Of variable length. |
| Calyx | Leaflets thick and imbricate at the base, ovate to rotund without acuminate apices | Often elongate with acuminate apices. |
| Corolla | Distinctively structured Inner corolla that is folded upon itself into an inverted annulus, very woolly inside near base of corona. Whole of corolla large and thick textured. | Corolla near corona base rarely woolly. Very rarely with annulus, when present annulus is shallow or extroverted. Corolla often think textured. |
| Corona | Simple inner corona lobe consisting of a laterally flattened tooth-like structure adnate with staminal head. Never erect. Outer corona not hollow, without open channel on underside. | Inner corona of variable shape, sometimes erect. Often hollow with open channel on underside. |
| Pollinaria | Translator arms very twisted. | Translator arms variable but never twisted to the degree as those in Eriostemma. |

| | | |
|----------|---|--|
| Pollinia | Flask-shaped without obvious pellucid edge. | Variable in shape often with a visible pellucid edge. |
| Fruit | Mesocarp inflated and filled with spongy material. Seeds mature to dull green-blue. | Mesocarp adnate to endocarp. Seeds mature dark-brown to white in color, never dull green-blue. |

Eriostemma Species

Eriostemma affinis (Hemsley) Klopp. & Gilding. Type: Comins 57. In Kew Bulletin of Miscellaneous Information (1892) 126-127.

Eriostemma ariadna (Decaisne) Klopp. & Gilding. Type ? In Prodromus Syst. Veg. 8 (1844) 635.

Eriostemma ciliata (Elmer ex Burton) Klopp. & Gilding. Type: Elmer 11072 (A). In The Hoyan 9(4) (1988) i.

Eriostemma coronaria (Blume) Klopp. & Gilding. Type: t. 1063 in Bijdragen tot de Flora Nederlandsch Indie (Bijdr. 1825).

Eriostemma gigas (Schlechter) Klopp. & Gilding. Type: Schlechter 19289. (B) In Botanische Jahrbücher 50 (1913) 136.

Eriostemma guppyi (Hemsley) Klopp. & Gilding. Type: Guppy 188. In Icones Plantarum 23 (1892) 2247.

Eriostemma hollrungii (Warburg) Klopp. & Gilding. Type: Hollrung 661. In Repertorium Specierum novarum 3 (1907) 342.

Eriostemma lauterbachii (Schumann) Klopp. & Gilding. Type: Lauterbach 930 (B). In Dictionary of Gardening 1 (1885).

Eriostemma lutea (Kostel.) Klopp. & Gilding. Type: 1083. In Algem. Med.-Pharm. Fl. 3:1834.

Eriostemma madulidii (Kloppenburg) Klopp. & Gilding. Type: Bolster 357. In Fraterna 3 (1990) IV.

Eriostemma noeguinensis (Engler) Klopp. & Gilding. Type ?. In Botanische Jahrbücher 7 (1886) 471.

Eriostemma peekelii (Markgraf) Klopp. & Gilding. Type: Peekel 1047. In Notizblatt des Botanischen und Museums zu Berlin-Dahlem 10:119-110: 1927.

Eriostemma pulgarensis (Elmer) Klopp. & Gilding. Type Elmer 12985. In Leaflets of Philippine Botany 10:3588-3590:1938-39.

Eriostemma purpurea (Blume) Klopp. & Gilding. Type t. 182. In Rumphia 4:31-32:1848.

Eriostemma subcalva (Burkill.) Klopp. & Gilding. Type Hollrung 28 (?). Kew Bull. (1901)

Eriostemma velutina (Wight) Klopp. & Gilding. Type: Wall 39. In Contributions to the Botany of India t. 8150:35-36:1834.

New considerations: I feel the section Skinostemma could be eliminated and the monotypic species *Hoya heuschkeliana* Klopp. since it has a bilobed corona could be placed in the Section Acanthostemma (Bl.) Klopp, Subsection Externatae Klopp.. That is if one wishes not to make the urceolate corolla a leading factory. Along the same line of reasoning the Section Peltostemma Schlechter could be eliminated and its species/specie since they are also bilobed could be transferred to the Section Acanthostemma.

Borneo is turning up some interesting different, and transitional species which will need consideration. To date this includes *Hoya kloppenburgii* Green and the soon to be published species *Hoya gildingii* Kloppenburg. They bridge several different present sections.